

# **B.E. - AUTOMOBILE ENGINEERING**

## **Curriculum & Syllabus for Semester I and II**

### **REGULATIONS 2024 (Academic Year 2024-25 Onwards)**





**K.S.R. COLLEGE OF ENGINEERING**  
**An Autonomous Institution**  
**Approved by AICTE and Affiliated to Anna University, Chennai**  
**Accredited by NAAC ('A++' Grade)**

**Department** Department of Automobile Engineering  
**Programme** B.E – Automobile Engineering

### Vision of the Institution

**IV** We envision to achieve status as an excellent Educational Institution in the global knowledge hub, making self-learners, experts, ethical and responsible engineers, technologists, scientists, managers, administrators and entrepreneurs who will significantly contribute to research and environment friendly sustainable growth of the nation and the world.

### Mission of the Institution

- IM 1** To inculcate in the students self-learning abilities that enable them to become competitive and considerate engineers, technologists, scientists, managers, administrators and entrepreneurs by diligently imparting the best of education, nurturing environmental and social needs.
- IM 2** To foster and maintain mutually beneficial partnership with global industries and Institutions through knowledge sharing, collaborative research and innovation.

### Vision of the Department

**DV** Education and research to meet the need of global automotive industry and society.


### Mission of the Department

- DM 1** Quality education through flexible curriculum, research and self-learning.
- DM 2** Training via automotive industry for a sustainable society and social development.

### Program Educational Objectives (PEOs)

The graduates of the programme will be able to	
<b>PEO 1</b>	<b>Core expertise:</b> Apply technical knowledge and competitive in automobile engineering field.
<b>PEO 2</b>	<b>Sustainable Solutions:</b> Impart inter-disciplinary skills and innovations for challenges that emerge in automobile sector.
<b>PEO 3</b>	<b>Ethical Proficiency:</b> Enhance knowledge with professional ethics, attitude, communication and leadership skills.

Program Outcomes (POs)	
<b>PO1</b>	<b>Engineering Graduates will be able to:</b> <b>Engineering Knowledge:</b> Apply knowledge of mathematics, natural science, computing, engineering fundamentals and an engineering specialization as specified in WK1 to WK4 respectively to develop to the solution of complex engineering problems.
<b>PO2</b>	<b>Problem Analysis:</b> Identify, formulate, review research literature and analyze complex engineering problems reaching substantiated conclusions with consideration for sustainable development.
<b>PO3</b>	<b>Design/Development of Solutions:</b> Design creative solutions for complex engineering problems and design/develop systems/components/processes to meet identified needs with consideration for the public health and safety, whole-life cost, net zero carbon, culture, society and environment as required.
<b>PO4</b>	<b>Conduct Investigations of Complex Problems:</b> Conduct investigations of complex engineering problems using research-based knowledge including design of experiments, modelling, analysis & interpretation of data to provide valid conclusions.
<b>PO5</b>	<b>Engineering Tool Usage:</b> Create, select and apply appropriate techniques, resources and modern engineering & IT tools, including prediction and modelling recognizing their limitations to solve complex engineering problems.
<b>PO6</b>	<b>The Engineer and The World:</b> Analyze and evaluate societal and environmental aspects while solving complex engineering problems for its impact on sustainability with reference to economy, health, safety, legal framework, culture and environment.
<b>PO7</b>	<b>Ethics:</b> Apply ethical principles and commit to professional ethics, human values, diversity and inclusion; adhere to national & international laws.
<b>PO8</b>	<b>Individual and Collaborative Team work:</b> Function effectively as an individual, and as a member or leader in diverse/multi-disciplinary teams.
<b>PO9</b>	<b>Communication:</b> Communicate effectively and inclusively within the engineering community and society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations considering cultural, language, and learning differences
<b>PO10</b>	<b>Project Management and Finance:</b> Apply knowledge and understanding of engineering management principles and economic decision-making and apply these to one's own work, as a member and leader in a team, and to manage projects and in multidisciplinary environments.
<b>PO11</b>	<b>Life-Long Learning:</b> Recognize the need for, and have the preparation and ability for i) independent and life-long learning ii) adaptability to new and emerging technologies and iii) critical thinking in the broadest context of technological change.
Program Specific Outcomes (PSOs)	
<b>PSO1</b>	<b>Professional competency:</b> Design and analyze automotive components, electrical and electronic systems.
<b>PSO2</b>	<b>Troubleshoot Skills:</b> Develop as a professional in automotive systems maintenance.

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Department		Department of Automobile Engineering									
Programme		B.E. Automobile Engineering									
SEMESTER I											
S. No.	Course Code	Course Title	Category	Periods / Week				Credit	Max. Marks		
				L	T	P	Tot		CA	ES	Tot
Induction Programme			-	-	-	-	-	-	-	-	-
<b>THEORY COURSES</b>											
1.	24ENT19	Professional Communication	HSMC	3	0	0	3	3	40	60	100
2.	24MET16	Engineering Drawing	PCC	2	0	4	6	4	40	60	100
3.	24ITT16	Programming for Problem Solving	ESC	3	0	0	3	3	40	60	100
4.	24GET19	தமிழர் மரபு / Heritage of Tamils	HSMC	1	0	0	1	1	40	60	100
<b>THEORY COURSES WITH LABORATORY COMPONENT</b>											
5.	24MAI19	Matrices and Calculus	BSC	2	1	2	5	4	50	50	100
6.	24PHI06	Applied Physics	BSC	3	0	2	5	4	50	50	100
<b>LABORATORY COURSES</b>											
7.	24ITP16	Programming for Problem Solving Laboratory	ESC	0	0	2	2	1	60	40	100
8.	24GEP17	Manufacturing Practices Laboratory	ESC	0	0	2	2	1	60	40	100
<b>EMPLOYABILITY ENHANCEMENT COURSE</b>											
9.	24SSP19	Aptitude and Coding Skills - I	EEC	0	0	2	2	1	100	-	100
<b>TOTAL</b>				<b>14</b>	<b>1</b>	<b>14</b>	<b>29</b>	<b>22</b>	<b>900</b>		

SEMESTER II											
S. No.	Course Code	Course Title	Category	Periods / Week				Credit	Max. Marks		
				L	T	P	Tot		CA	ES	Tot
<b>THEORY COURSES</b>											
1.	24CST29	Python Programming	ESC	3	0	0	3	3	40	60	100
2.	24MET26	Design Thinking	PCC	2	0	0	2	2	40	60	100
3.	24EET06	Basic Electrical and Electronics Engineering	ESC	3	0	0	3	3	40	60	100
4.	24GET29	தமிழரும் தொழில்நுட்பமும் / Tamils and Technology	HSMC	1	0	0	1	1	40	60	100
<b>THEORY COURSES WITH LABORATORY COMPONENT</b>											
5.	24MAI29	Probability and Statistics	BSC	2	1	2	5	4	50	50	100
6.	24CHI07	Applied Chemistry	BSC	3	0	2	5	4	50	50	100
<b>LABORATORY COURSES</b>											
7.	24ENP29	Professional Communication Laboratory	HSMC	0	0	2	2	1	60	40	100
8.	24CSP29	Python Programming Laboratory	ESC	0	0	2	2	1	60	40	100
9.	24AUP21	Computer Aided Drawing Laboratory	PCC	0	0	2	2	1	60	40	100
<b>EMPLOYABILITY ENHANCEMENT COURSE</b>											
10.	24SSP29	Aptitude and Coding Skills - II	EEC	0	0	2	2	1	100	-	100
<b>MANDATORY COURSE</b>											
11.	24MC09	Mandatory Course – I	MC	0	0	2	2	0	-	-	-
<b>TOTAL</b>				<b>14</b>	<b>1</b>	<b>14</b>	<b>29</b>	<b>21</b>	<b>1000</b>		

SEMESTER III											
S. No.	Course Code	Course Title	Category	Periods / Week				Credit	Max. Marks		
				L	T	P	Tot		CA	ES	Tot
<b>THEORY COURSES</b>											
1.	24MAT36	Transforms and Complex Variables	BSC	3	1	0	4	4	40	60	100
2.	24AUT31	Automotive Thermal Engineering	PCC	3	1	0	4	4	40	60	100
3.	24AUT32	Engines and Transmission Systems	PCC	3	0	0	3	3	40	60	100
4.	24MET36	Engineering Mechanics	PCC	3	1	0	4	4	40	60	100
5.	24SFT36	Manufacturing Processes	PCC	3	0	0	3	3	40	60	100
<b>THEORY COURSES WITH LABORATORY COMPONENT</b>											
6.	24MEI36	Fluid Mechanics and Machinery	PCC	3	0	2	5	4	50	50	100
<b>LABORATORY COURSES</b>											
7.	24SFP36	Manufacturing Processes Laboratory	PCC	0	0	2	2	1	60	40	100
8.	24AUP31	Engine Performance and Emission Testing Laboratory	PCC	0	0	2	2	1	60	40	100
9.	24AUP32	Design Studio - I	PCC	0	0	2	2	1	100	-	100
<b>EMPLOYABILITY ENHANCEMENT COURSE</b>											
10.	24SSP39	Aptitude and Coding Skills - III	EEC	0	0	2	2	1	100	-	100
<b>TOTAL</b>				<b>18</b>	<b>3</b>	<b>10</b>	<b>31</b>	<b>26</b>	<b>1000</b>		
<b>SEMESTER IV</b>											
S.	Course	Course Title	Category	Periods / Week				Credit	Max. Marks		

No.	Code		ory	L	T	P	Tot		CA	ES	Tot
<b>THEORY COURSES</b>											
1.	24MAT46	Linear Algebra and Numerical Methods	BSC	3	1	0	4	<b>4</b>	40	60	100
2.	24AUT41	Mechanics of Machines	PCC	3	1	0	4	<b>4</b>	40	60	100
3.	24MET46	Strength of Materials	PCC	3	1	0	4	<b>4</b>	40	60	100
4.	24GET49	Universal Human Values	HSMC	3	0	0	3	<b>3</b>	40	60	100
<b>THEORY COURSES WITH LABORATORY COMPONENT</b>											
5.	24AUI41	Automotive Chassis and Components	PCC	3	0	2	5	<b>4</b>	50	50	100
6.	24AUI42	Automotive Fuels and Lubricants	PCC	3	0	2	5	<b>4</b>	50	50	100
<b>LABORATORY COURSES</b>											
7.	24MEP46	Strength of Materials Laboratory	PCC	0	0	2	2	<b>1</b>	60	40	100
8.	24AUP41	Design Studio - II	PCC	0	0	2	2	<b>1</b>	100	-	100
<b>EMPLOYABILITY ENHANCEMENT COURSE</b>											
9.	24SSP49	Aptitude and Coding Skills - IV	EEC	0	0	2	2	<b>1</b>	100	-	100
<b>TOTAL</b>				<b>18</b>	<b>3</b>	<b>10</b>	<b>31</b>	<b>26</b>	<b>900</b>		

<b>SEMESTER V</b>											
S. No.	Course Code	Course Title	Category	Periods / Week				Credit	Max. Marks		
				L	T	P	Tot		CA	ES	Tot
<b>THEORY COURSES</b>											
1.	24AUT51	Automotive Engine and Chassis Components Design	PCC	3	1	0	4	<b>4</b>	40	60	100
2.	24AUT52	Vehicle Body Engineering	PCC	3	0	0	3	<b>3</b>	40	60	100
3.	24AUT53	Automotive Electrical and Electronics	PCC	3	0	0	3	<b>3</b>	40	60	100
4.		Professional Elective – I	PEC	3	0	0	3	<b>3</b>	40	60	100
5.		Professional Elective – II	PEC	3	0	0	3	<b>3</b>	40	60	100
6.		Open Elective – I	OEC	3	0	0	3	<b>3</b>	40	60	100
<b>LABORATORY COURSES</b>											
7.	24AUP51	Automotive Components Modeling Laboratory	PCC	0	0	2	2	<b>1</b>	60	40	100
8.	24AUP52	Automotive Electrical and Electronics Laboratory	PCC	0	0	2	2	<b>1</b>	60	40	100
<b>EMPLOYABILITY ENHANCEMENT COURSE</b>											
9.	24AUP53	Internship – I*	EEC	0	0	0	0	<b>1</b>	100	-	100
<b>MANDATORY COURSE</b>											
10.	24MCT51	Mandatory Course - II	MC	2	0	0	2	<b>0</b>	100	-	100
<b>TOTAL</b>				<b>20</b>	<b>1</b>	<b>4</b>	<b>25</b>	<b>22</b>	<b>1000</b>		
*The students should undergo internship during the IV semester summer vacation.											

SEMESTER VI											
S. No.	Course Code	Course Title	Category	Periods / Week				Credit	Max. Marks		
				L	T	P	Tot		CA	ES	Tot
<b>THEORY COURSES</b>											
1.	24AUT61	Vehicle Maintenance and Testing	PCC	3	0	0	3	3	40	60	100
2.	24AUT62	Electric and Hybrid Vehicles	PCC	3	0	0	3	3	40	60	100
3.		Professional Elective – III	PEC	3	0	0	3	3	40	60	100
4.		Professional Elective – IV	PEC	3	0	0	3	3	40	60	100
5.		Open Elective – II	OEC	3	0	0	3	3	40	60	100
<b>THEORY COURSES WITH LABORATORY COMPONENT</b>											
6.	24MEI66	Finite Element Analysis	PCC	3	0	2	5	4	50	50	100
<b>LABORATORY COURSES</b>											
7.	24AUP61	Vehicle Maintenance and Reconditioning Laboratory	PCC	0	0	2	2	1	60	40	100
<b>EMPLOYABILITY ENHANCEMENT COURSES</b>											
8.	24AUP62	Mini Project	EEC	0	0	4	4	2	60	40	100
<b>MANDATORY COURSE</b>											
9.	24MCT61	Mandatory Course - III	MC	2	0	0	2	0	100	-	100
<b>TOTAL</b>				<b>20</b>	<b>0</b>	<b>8</b>	<b>28</b>	<b>22</b>	<b>900</b>		
<b>SEMESTER VII</b>											
S. No.	Course Code	Course Title	Category	Periods / Week				Credit	Max. Marks		
				L	T	P	Tot		CA	ES	Tot
<b>THEORY COURSES</b>											
1.	24GET79	Professional Ethics	HSMC	3	0	0	3	3	40	60	100
2.		Management Elective	HSMC	3	0	0	3	3	40	60	100
3.		Professional Elective – V	PEC	3	0	0	3	3	40	60	100
4.		Professional Elective – VI	PEC	3	0	0	3	3	40	60	100
5.		Open Elective – III	OEC	3	0	0	3	3	40	60	100
<b>EMPLOYABILITY ENHANCEMENT COURSE</b>											
6.	24AUP71	Project Work Phase - I	EEC	0	0	4	4	2	60	40	100
7.	24AUP72	Internship – II*	EEC	0	0	0	0	1	100	-	100
<b>TOTAL</b>				<b>15</b>	<b>0</b>	<b>4</b>	<b>19</b>	<b>18</b>	<b>700</b>		
*The students should undergo internship during the VI semester summer vacation.											
<b>SEMESTER VIII</b>											
S. No.	Course Code	Course Title	Category	Periods / Week				Credit	Max. Marks		
				L	T	P	Tot		CA	ES	Tot
<b>EMPLOYABILITY ENHANCEMENT COURSE</b>											
1.	24AUP81	Project Work Phase – II	EEC	0	0	16	16	8	60	40	100
<b>TOTAL</b>				<b>0</b>	<b>0</b>	<b>16</b>	<b>16</b>	<b>8</b>	<b>100</b>		
<b>TOTAL CREDITS</b>								<b>165</b>			
<b>TOTAL NUMBER OF CREDITS TO BE EARNED FOR AWARD OF THE DEGREE = 165</b>											
<b>Note:</b> HSMC - Humanities and Social Sciences including Management courses, BSC – Basic Science Courses, ESC – Engineering Science Courses, PCC – Professional core courses, PEC - Professional Elective courses, OEC – Open Elective courses, EEC – Employability Enhancement Courses & MC - Mandatory courses.											

HUMANITIES, SOCIAL SCIENCE AND MANAGEMENT COURSES (HSMC)											
S. No.	Course Code	Course Title	Semester	Periods / Week				Credit	Max. Marks		
				L	T	P	Tot		CA	ES	Tot
1.	24ENT19	Professional Communication	I	3	0	0	3	3	40	60	100
2.	24GET19	Heritage of Tamils	I	1	0	0	1	1	40	60	100
3.	24GET29	Tamils and Technology	II	1	0	0	1	1	40	60	100
4.	24ENP29	Professional Communication Laboratory	II	0	0	2	2	1	60	40	100
5.	24GET49	Universal Human values	IV	3	0	0	3	3	40	60	100
6.	24GET79	Professional Ethics	VII	3	0	0	3	3	40	60	100
7.		Management – Elective	VII	3	0	0	3	3	40	60	100
<b>TOTAL</b>				<b>14</b>	<b>0</b>	<b>2</b>	<b>16</b>	<b>15</b>			

BASIC SCIENCE COURSES (BSC)											
S. No.	Course Code	Course Title	Semester	Periods / Week				Credit	Max. Marks		
				L	T	P	Tot		CA	ES	Tot
1.	24MAI19	Matrices and Calculus	I	2	1	2	5	4	50	50	100
2.	24PHI06	Applied Physics	I	3	0	2	5	4	50	50	100
3.	24MAI29	Probability and Statistics	II	2	1	2	5	4	50	50	100
4.	24CHI07	Applied Chemistry	II	3	0	2	5	4	50	50	100
5.	24MAT36	Transforms and Complex Variables	III	3	1	0	4	4	40	60	100
6.	24MAT46	Numerical Methods and Optimisation Techniques	IV	3	1	0	4	4	40	60	100
<b>TOTAL</b>				<b>16</b>	<b>4</b>	<b>8</b>	<b>28</b>	<b>24</b>			


ENGINEERING SCIENCE COURSES(ESC)											
S. No.	Course Code	Course Title	Semester	Periods / Week				Credit	Max. Marks		
				L	T	P	Tot		CA	ES	Tot
1.	24ITT16	Programming for Problem Solving	I	3	0	0	3	3	40	60	100
2.	24ITP16	Programming for Problem Solving Laboratory	I	0	0	2	2	1	60	40	100
3.	24GEP17	Manufacturing Practices Laboratory	I	0	0	2	2	1	60	40	100
4.	24CST26	Python Programming	II	3	0	0	3	3	40	60	100
5.	24EET06	Basics of Electrical and Electronics Engineering	II	3	0	0	3	3	40	60	100
6.	24CSP29	Python Programming Laboratory	II	0	0	2	2	1	60	40	100
<b>TOTAL</b>				<b>9</b>	<b>0</b>	<b>6</b>	<b>15</b>	<b>12</b>			



EMPLOYABILITY ENHANCEMENT COURSES (EEC)											
S. No.	Course Code	Course Title	Semester	Periods / Week				Credit	Max. Marks		
				L	T	P	Tot		CA	ES	Tot
1.	24SSP19	Aptitude and Coding Skills - I	I	0	0	2	2	1	100	-	100
2.	24SSP29	Aptitude and Coding Skills - II	II	0	0	2	2	1	100	-	100
3.	24SSP39	Aptitude and Coding Skills - III	III	0	0	2	2	1	100	-	100
4.	24SSP49	Aptitude and Coding Skills - IV	IV	0	0	2	2	1	100	-	100
5.	24AUP53	Internship – I	V	0	0	0	0	1	100	-	-
6.	24AUP62	Mini Project	VI	0	0	4	4	2	100	-	100
7.	24AUP71	Project Work Phase – I	VII	0	0	4	4	2	60	40	100
8.	24AUP72	Internship – II	VII	0	0	0	0	1	100	-	-
9.	24AUP81	Project Work Phase – II	VIII	0	0	16	16	8	60	40	100
<b>TOTAL</b>				<b>0</b>	<b>0</b>	<b>32</b>	<b>32</b>	<b>18</b>			

PROFESSIONAL CORE COURSES (PCC)											
S. No.	Course Code	Course Title	Semester	Periods / Week				Credit	Max. Marks		
				L	T	P	Tot		CA	ES	Tot
1.	24MET16	Engineering Drawing	I	2	0	4	6	4	40	60	100
2.	24AUP21	Computer Aided Drawing Laboratory	II	0	0	2	2	1	60	40	100
3.	24MET26	Design Thinking	II	2	0	0	2	2	40	60	100
4.	24AUT31	Automotive Thermal Engineering	III	3	1	0	4	4	40	60	100
5.	24AUT32	Engines and Transmission Systems	III	3	0	0	3	3	40	60	100
6.	24MET36	Engineering Mechanics	III	3	1	0	4	4	40	60	100
7.	24SFT36	Manufacturing Processes	III	3	0	0	3	3	40	60	100
8.	24MEI36	Fluid Mechanics and Machinery	III	3	0	2	5	4	50	50	100
9.	24SFP36	Manufacturing Processes Laboratory	III	0	0	2	2	1	60	40	100
10.	24AUP31	Engine Performance and Emission Testing Laboratory	III	0	0	2	2	1	60	40	100
11.	24AUP32	Design Studio - I	III	0	0	2	2	1	100	-	100
12.	24AUT41	Mechanics of Machines	IV	3	1	0	4	4	40	60	100
13.	24MET46	Strength of Materials	IV	3	1	0	4	4	40	60	100
14.	24AUI41	Automotive Chassis and Components	IV	3	0	2	5	4	50	50	100
15.	24AUI42	Automotive Fuels and Lubricants	IV	3	0	2	5	4	50	50	100
16.	24MEP46	Strength of Materials Laboratory	IV	0	0	2	2	1	60	40	100
17.	24AUP41	Design Studio - II	IV	0	0	2	2	1	100	-	100
18.	24AUT51	Automotive Engine and Chassis Components Design	V	3	1	0	4	4	40	60	100
19.	24AUT52	Vehicle Body Engineering	V	3	0	0	3	3	40	60	100
20.	24AUT53	Automotive Electrical and Electronics	V	3	0	0	3	3	40	60	100
21.	24AUP51	Automotive Components Modeling Laboratory	V	0	0	2	2	1	60	40	100
22.	24AUP52	Automotive Electrical and Electronics Laboratory	V	0	0	2	2	1	60	40	100
23.	24AUT61	Vehicle Maintenance and Testing	VI	3	0	0	3	3	40	60	100
24.	24AUT62	Electric and Hybrid Vehicles	VI	3	0	0	3	3	40	60	100
25.	24MEI66	Finite Element Analysis	VI	3	0	2	5	4	50	50	100
26.	24AUP61	Vehicle Maintenance and Reconditioning Laboratory	VI	0	0	2	2	1	60	40	100
<b>TOTAL</b>				<b>49</b>	<b>5</b>	<b>30</b>	<b>84</b>	<b>69</b>			

<b>VERTICAL-1</b>	<b>VERTICAL-2</b>	<b>VERTICAL-3</b>	<b>VERTICAL-4</b>	<b>VERTICAL-5</b>	<b>VERTICAL-6</b>
<b>Electric Vehicle</b>	<b>Automotive Design</b>	<b>Automotive Integrated Technology</b>	<b>Thermal Engineering</b>	<b>Manufacturing Engineering</b>	<b>Automotive Management</b>
Electric Two and Three Wheeler	Computer Simulation of IC Engine Processes	Fuel Cells and Applications	Advanced Theory of I.C. Engines	Material Science and Metallurgy	Engine and Vehicle Management System
Battery Technology	Vehicle Dynamics	Vehicle Control Systems	Automotive Pollution and Control	Automotive Fabrication Processes	Transport Management
Motors and Drives	Vehicle Architecture	Intelligent Vehicles Technology	Alternative Fuels and Energy Systems	Additive Manufacturing	Vehicle Dealership Management
Automotive Power Electronics	Automotive Vehicle Safety	Autonomous Vehicle Technology	Automotive Air-Conditioning	Hydraulics and Pneumatics Systems	Ergonomics in Automotive Design
Electric Vehicle Maintenance	Tyre Technology	IoT in Automobiles	Combustion Thermodynamics and Heat Transfer	Computer Aided Manufacturing	Noise, Vibration and Harshness
Connected Cars and ADAS	Automotive Aerodynamics	Artificial Intelligence for Automobiles	Thermal Power Engineering	Production Planning and Control	Value Engineering
Sensors and Actuators	Robotics and Automation	Automotive Instrumentation	Advanced Internal Combustion Engines	Lean Manufacturing	Entrepreneurship Development
Automotive Functional Safety	Drone Technologies	Special Purpose Vehicles	Turbomachines	Industry 4.0	Operations Research

		<b>K.S.R. COLLEGE OF ENGINEERING (Autonomous)</b> <b>(Approved by AICTE &amp; Affiliated to Anna University)</b> <b>Accredited by NAAC “A+” Grade</b> <b>K.S.R. Kalvi Nagar, Tiruchengode – 637 215</b>								<b>CURRICULUM</b> <b>UG</b> <b>R – 2024</b>	
Department		Department of Automobile Engineering									
Programme		B.E – Automobile Engineering									
<b>List of Electives</b>											
<b>VERTICAL-1: Electric Vehicle</b>											
Sl.No.	Course Code	Course Name	Specialization	Category	Hours/ Week			Credit	Maximum Marks		
					L	T	P		C	CA	ES
1.	24AUE01	Electric Two and Three Wheeler	S1	PEC	3	0	0	3	40	60	100
2.	24AUE02	Battery Technology	S1	PEC	3	0	0	3	40	60	100
3.	24AUE03	Motors and Drives	S1	PEC	3	0	0	3	40	60	100
4.	24AUE04	Automotive Power Electronics	S1	PEC	3	0	0	3	40	60	100
5.	24AUE05	Electric Vehicle Maintenance	S1	PEC	3	0	0	3	40	60	100
6.	24AUE06	Connected Cars and ADAS	S1	PEC	3	0	0	3	40	60	100
7.	24AUE07	Sensors and Actuators	S1	PEC	3	0	0	3	40	60	100
8.	24AUE08	Automotive Functional Safety	S1	PEC	3	0	0	3	40	60	100

<b>VERTICAL-2: Automotive Design</b>											
Sl.No.	Course Code	Course Name	Specialization	Category	Hours/ Week			Credit	Maximum Marks		
					L	T	P		C	CA	ES
1.	24AUE09	Computer Simulation of IC Engine Processes	S2	PEC	3	0	0	3	40	60	100
2.	24AUE10	Vehicle Dynamics	S2	PEC	3	0	0	3	40	60	100
3.	24AUE11	Vehicle Architecture	S2	PEC	3	0	0	3	40	60	100
4.	24AUE12	Automotive Vehicle Safety	S2	PEC	3	0	0	3	40	60	100
5.	24AUE13	Tyre Technology	S2	PEC	3	0	0	3	40	60	100
6.	24AUE14	Automotive Aerodynamics	S2	PEC	3	0	0	3	40	60	100
7.	24AUE15	Robotics and Automation	S2	PEC	3	0	0	3	40	60	100
8.	24MEE19	Drone Technologies	S2	PEC	3	0	0	3	40	60	100

VERTICAL-3: Automotive Integrated Technology											
Sl.No.	Course Code	Course Name	Specialization	Category	Hours/ Week			Credit	Maximum Marks		
					L	T	P		C	CA	ES
1.	24AUE16	Fuel Cells and Applications	S3	PEC	3	0	0	3	40	60	100
2.	24AUE17	Vehicle Control Systems	S3	PEC	3	0	0	3	40	60	100
3.	24AUE18	Intelligent Vehicles Technology	S3	PEC	3	0	0	3	40	60	100
4.	24AUE19	Autonomous Vehicle Technology	S3	PEC	3	0	0	3	40	60	100
5.	24AUE20	IoT in Automobiles	S3	PEC	3	0	0	3	40	60	100
6.	24AUE21	Artificial Intelligence for Automobiles	S3	PEC	3	0	0	3	40	60	100
7.	24AUE22	Automotive Instrumentation	S3	PEC	3	0	0	3	40	60	100
8.	24AUE23	Special Purpose Vehicles	S3	PEC	3	0	0	3	40	60	100

VERTICAL-4: Thermal Engineering											
Sl.No.	Course Code	Course Name	Specialization	Category	Hours/ Week			Credit	Maximum Marks		
					L	T	P		C	CA	ES
1.	24AUE24	Advanced Theory of I.C. Engines	S4	PEC	3	0	0	3	40	60	100
2.	24AUE25	Automotive Pollution and Control	S4	PEC	3	0	0	3	40	60	100
3.	24AUE26	Alternative Fuels and Energy Systems	S4	PEC	3	0	0	3	40	60	100
4.	24AUE27	Automotive Air-Conditioning	S4	PEC	3	0	0	3	40	60	100
5.	24AUE28	Combustion Thermodynamics and Heat Transfer	S4	PEC	3	0	0	3	40	60	100
6.	24AUE29	Thermal Power Engineering	S4	PEC	3	0	0	3	40	60	100
7.	24AUE30	Advanced Internal Combustion Engines	S4	PEC	3	0	0	3	40	60	100
8.	24MEE39	Turbomachines	S4	PEC	3	0	0	3	40	60	100

VERTICAL-5: Manufacturing Engineering											
Sl.No.	Course Code	Course Name	Specialization	Category	Hours/ Week			Credit	Maximum Marks		
					L	T	P		C	CA	ES
1.	24AUE31	Material Science and Metallurgy	S5	PEC	3	0	0	3	40	60	100
2.	24AUE32	Automotive Fabrication Processes	S5	PEC	3	0	0	3	40	60	100
3.	24AUE33	Additive Manufacturing	S5	PEC	3	0	0	3	40	60	100
4.	24AUE34	Hydraulics and Pneumatics Systems	S5	PEC	3	0	0	3	40	60	100
5.	24AUE35	Computer Aided Manufacturing	S5	PEC	3	0	0	3	40	60	100
6.	24AUE36	Production Planning and Control	S5	PEC	3	0	0	3	40	60	100
7.	24MEE12	Lean Manufacturing	S5	PEC	3	0	0	3	40	60	100
8.	24AUE37	Industry 4.0	S5	PEC	3	0	0	3	40	60	100

VERTICAL-6: Automotive Management											
Sl.No.	Course Code	Course Name	Specialization	Category	Hours/ Week			Credit	Maximum Marks		
					L	T	P		C	CA	ES
1.	24AUE38	Engine and Vehicle Management System	S6	PEC	3	0	0	3	40	60	100
2.	24AUE39	Transport Management	S6	PEC	3	0	0	3	40	60	100
3.	24AUE40	Vehicle Dealership Management	S6	PEC	3	0	0	3	40	60	100
4.	24AUE41	Ergonomics in Automotive Design	S6	PEC	3	0	0	3	40	60	100
5.	24AUE42	Noise, Vibration and Harshness	S6	PEC	3	0	0	3	40	60	100
6.	24MEE01	Value Engineering	S6	PEC	3	0	0	3	40	60	100
7.	24AUE43	Entrepreneurship Development	S6	PEC	3	0	0	3	40	60	100
8.	24MEE06	Operations Research	S6	PEC	3	0	0	3	40	60	100

MANDATORY COURSE – I, II & III											
S. No.	Course Code	Course Title	Category	Periods / Week				Credit	Max. Marks		
				L	T	P	Tot		CA	ES	Tot
1.	24MCP09	Yoga for Stress Management	MC	0	0	2	2	0	-	-	-
2.	24MCT01	Constitution of India	MC	2	0	0	2	0	100	-	100
3.	24MCT02	Environmental Science and Sustainability	MC	2	0	0	2	0	100	-	100
4.	24MCT03	Introduction to Gender Studies	MC	2	0	0	2	0	100	-	100
5.	24MCT04	Life Science for Engineers	MC	2	0	0	2	0	100	-	100
6.	24MCT05	Industrial Safety	MC	2	0	0	2	0	100	-	100
7.	24MCT06	Essence of Indian Knowledge System	MC	2	0	0	2	0	100	-	100
8.	24MCT07	Elements of Literature	MC	2	0	0	2	0	100	-	100
9.	24MCT08	Disaster Management	MC	2	0	0	2	0	100	-	100

MANAGEMENT ELECTIVES											
S. No.	Course Code	Course Title	Category	Periods / Week				Credit	Max. Marks		
				L	T	P	Tot		CA	ES	Tot
1.	24MGT01	Total Quality Management	HSMC	3	0	0	3	3	40	60	100
2.	24MGT02	Principles of Management	HSMC	3	0	0	3	3	40	60	100
3.	24MGT03	Engineering Economics and Financial Accounting	HSMC	3	0	0	3	3	40	60	100
4.	24MGT04	Human Resource Management	HSMC	3	0	0	3	3	40	60	100
5.	24MGT05	Industrial Management	HSMC	3	0	0	3	3	40	60	100

**OPEN ELECTIVE COURSES****Open Elective courses offered by Automobile Engineering to other branches**

S. No.	Course Code	Course Title	Category	Periods / Week				Credit	Max. Marks		
				L	T	P	Tot		CA	ES	Tot
<b>OPEN ELECTIVE COURSES</b>											
1.	24AU001	Basics of Automobile Engineering	OEC	3	0	0	3	3	40	60	100
2.	24AU002	Automotive Engine Technology	OEC	3	0	0	3	3	40	60	100
3.	24AU003	Automotive Vehicle Technology	OEC	3	0	0	3	3	40	60	100
4.	24AU004	Automotive Safety	OEC	3	0	0	3	3	40	60	100
5.	24AU005	Hybrid Vehicles	OEC	3	0	0	3	3	40	60	100
6.	24AU006	Off Highway Vehicles	OEC	3	0	0	3	3	40	60	100
7.	24AU007	Modern and Intelligent Vehicle System	OEC	3	0	0	3	3	40	60	100
8.	24AU008	Vehicle Maintenance	OEC	3	0	0	3	3	40	60	100

**Open Elective courses offered by other branches**

S. No.	Course Code	Course Title	Category	Periods / Week				Credit	Max. Marks		
				L	T	P	Tot		CA	ES	Tot
<b>OPEN ELECTIVE COURSES</b>											
1.	24BMO01	Basics of Biomedical Instrumentation	OEC	3	0	0	3	3	40	60	100
2.	24BMO02	Imaging Equipments	OEC	3	0	0	3	3	40	60	100
3.	24BMO03	Biometric systems	OEC	3	0	0	3	3	40	60	100
4.	24BMO04	Human Assist Devices	OEC	3	0	0	3	3	40	60	100
5.	24BMO05	Medical Informatics	OEC	3	0	0	3	3	40	60	100
6.	24BMO06	Medical Innovation and Entrepreneurship	OEC	3	0	0	3	3	40	60	100
7.	24CEO01	Architecture Heritage of India	OEC	3	0	0	3	3	40	60	100
8.	24CEO02	Elementary Civil Engineering	OEC	3	0	0	3	3	40	60	100
9.	24CEO03	Modern Construction Materials	OEC	3	0	0	3	3	40	60	100
10.	24CEO04	Water and Air Pollution Management	OEC	3	0	0	3	3	40	60	100
11.	24CEO05	Water Harvesting and Management	OEC	3	0	0	3	3	40	60	100
12.	24CDO01	Animation Basics	OEC	3	0	0	3	3	40	60	100
13.	24CDO02	Data Visualization Techniques	OEC	3	0	0	3	3	40	60	100



14.	24CSO01	Programming in Java	OEC	3	0	0	3	3	40	60	100
15.	24CSO02	Fundamentals of Operating Systems	OEC	3	0	0	3	3	40	60	100
16.	24CSO03	Fundamentals of Database Systems	OEC	3	0	0	3	3	40	60	100
17.	24CSO04	Internet Programming	OEC	3	0	0	3	3	40	60	100
18.	24CSO05	Artificial Intelligence and Machine Learning	OEC	3	0	0	3	3	40	60	100
19.	24IOO01	Internet of Thing and its Applications	OEC	3	0	0	3	3	40	60	100
20.	24IOO02	Sensors and Actuator Devices	OEC	3	0	0	3	3	40	60	100
21.	24IOO03	Mobile Application Development	OEC	3	0	0	3	3	40	60	100
22.	24CBO01	Fundamentals of Cyber security	OEC	3	0	0	3	3	40	60	100
23.	24CBO02	Penetration and Vulnerability Testing Techniques	OEC	3	0	0	3	3	40	60	100
24.	24CBO03	Basics of Digital Forensics	OEC	3	0	0	3	3	40	60	100
25.	24CBO04	Introduction to Ethical Hacking	OEC	3	0	0	3	3	40	60	100
26.	24CBO05	Malware analysis	OEC	3	0	0	3	3	40	60	100
27.	24EEO01	Electrical Drives and Control	OEC	3	0	0	3	3	40	60	100
28.	24EEO02	Electrical Power Generation Systems	OEC	3	0	0	3	3	40	60	100
29.	24EEO03	Industrial Automation	OEC	3	0	0	3	3	40	60	100
30.	24EEO04	Electrical Instruments and Measurements	OEC	3	0	0	3	3	40	60	100
31.	24EEO05	Energy Conservation and Management	OEC	3	0	0	3	3	40	60	100
32.	24EEO06	Electrical Wiring, Estimation and Costing	OEC	3	0	0	3	3	40	60	100
33.	24EEO07	Fundamentals of Electrical Machinery	OEC	3	0	0	3	3	40	60	100
34.	24EEO08	Fundamentals of Electric Vehicle	OEC	3	0	0	3	3	40	60	100
35.	24ECO01	Consumer Electronics	OEC	3	0	0	3	3	40	60	100
36.	24ECO02	NANO Technology	OEC	3	0	0	3	3	40	60	100
37.	24ECO03	Fundamentals of Robotics	OEC	3	0	0	3	3	40	60	100
38.	24ECO04	Principles of Communication	OEC	3	0	0	3	3	40	60	100
39.	24ECO05	Electronics and Microprocessor	OEC	3	0	0	3	3	40	60	100
40.	24ITO01	Block chain Technologies	OEC	3	0	0	3	3	40	60	100

41.	24ITO02	Cyber security Fundamentals	OEC	3	0	0	3	3	40	60	100
42.	24ITO03	Cloud computing Techniques	OEC	3	0	0	3	3	40	60	100
43.	24ITO04	Data Science using R	OEC	3	0	0	3	3	40	60	100
44.	24ITO05	Fundamentals of Business Intelligence	OEC	3	0	0	3	3	40	60	100
45.	24MEO01	Basic Mechanical Engineering	OEC	3	0	0	3	3	40	60	100
46.	24MEO02	Solar Energy Utilization	OEC	3	0	0	3	3	40	60	100
47.	24MEO03	Selection of Materials	OEC	3	0	0	3	3	40	60	100
48.	24MEO04	Fibre Reinforced Plastics	OEC	3	0	0	3	3	40	60	100
49.	24MEO05	Rapid Prototyping	OEC	3	0	0	3	3	40	60	100
50.	24SFO01	Occupational Health and Hygiene	OEC	3	0	0	3	3	40	60	100
51.	24SFO02	Construction Safety	OEC	3	0	0	3	3	40	60	100
52.	24SFO03	Building Fire Safety	OEC	3	0	0	3	3	40	60	100
53.	24SFO04	Legal Aspects of Safety	OEC	3	0	0	3	3	40	60	100
54.	24SFO05	Safety measures for Engineers	OEC	3	0	0	3	3	40	60	100

Summary										
Name of the Programme: B.E Automobile Engineering										
CATEGORY	I	II	III	IV	V	VI	VII	VIII	TOTAL CREDITS	%
HSMC	4	2	-	3	-	-	6	-	15	9.09
BSC	8	8	4	4	-	-	-	-	24	14.54
ESC	5	7	-	-	-	-	-	-	12	7.27
PCC	4	3	21	18	12	11	-	-	69	41.81
PEC	-	-	-	-	6	6	6	-	18	10.9
OEC	-	-	-	-	3	3	3	-	9	5.45
EEC	1	1	1	1	1	2	3	8	18	10.90
MC	-	✓	-	✓	✓	-	-	-	-	-
<b>Total</b>	<b>22</b>	<b>21</b>	<b>26</b>	<b>26</b>	<b>22</b>	<b>22</b>	<b>18</b>	<b>8</b>	<b>165</b>	<b>100</b>

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24ENT19	PROFESSIONAL COMMUNICATION	Category	L	T	P	C
		HSMC	3	0	0	3
<b>(Common to All Branches)</b>						
<b>PREREQUISITE:</b>						
A comprehensive understanding of basic English grammar, vocabulary, and sentence structure with familiarity in Business Communication and Technical Writing are considered as pre-requisites for the course.						
<b>OBJECTIVES:</b>						
<ul style="list-style-type: none"> <li>• To enable learners to compare and contrast the ideas/products in a technical context.</li> <li>• To make learners to critically evaluate the written text and write report and paragraphs.</li> <li>• To facilitate learners’ problem-based writing and to enable them describe the process/product.</li> <li>• To enable learners to interpret the graphical representation in order to prepare extensive descriptions.</li> <li>• To prepare the learners to draft effective SOP/Resume for job/internships.</li> </ul>						
<b>UNIT - I</b>	<b>UNDERSTANDING COMPARISONS AND CONTRASTS</b>					<b>(9)</b>
<b>Reading-</b> Reading brochures (technical context), telephone messages/ social media messages relevant to technical contexts and emails. <b>Writing-</b> Writing emails/letters introducing oneself, - Compare and Contrast Essay. <b>Grammar</b> –Present Tenses, - Question types: WH /Yes or No/and Tags. <b>Vocabulary</b> - Synonyms; One-word substitution; Abbreviations &Acronyms (as used in technical contexts).						
<b>UNIT - II</b>	<b>WRITING REPORTS AND PARAGRAPHS</b>					<b>(9)</b>
<b>Reading-</b> Reading longer technical texts, biographies, travelogues, newspaper reports, Excerpts from literature, and travel & technical blogs, <b>Writing-</b> Paragraph writing, Short Report on an event (industrial visit) <b>Grammar</b> –Active-Passive Voice transformations, Infinitive and Gerunds, Past Tenses -Subject-Verb Agreement; Prepositions. <b>Vocabulary</b> -Word formations (Prefixes &Suffixes); portmanteau words and Antonyms.						
<b>UNIT - III</b>	<b>DESCRIBING THE PROCESS/PRODUCT</b>					<b>(9)</b>
<b>Reading-</b> Advertisements, gadget reviews; user manuals, case studies, excerpts from literary texts, news reports etc. <b>Writing</b> – Definitions; Instructions; Product/Process description, Checklists, Problem solution essay/Argumentative Essay. <b>Grammar</b> –Future Tenses; If conditional clauses. <b>Vocabulary</b> – Nominal Compounds, Homonyms and Homophones, Discourse Markers (connectives &sequence words).						
<b>UNIT - IV</b>	<b>TRANSCODING AND RECOMMENDATIONS</b>					<b>(9)</b>
<b>Reading</b> –Newspaper articles, Journal reports–and Non verbal Communication (tables, pie charts etc.); <b>Writing</b> – Recommendations, Note-making, Transcoding <b>Grammar</b> –Articles; Relative pronouns, Modals <b>Vocabulary</b> –Collocations and phrasal verbs.						
<b>UNIT - V</b>	<b>SUMMATION AND DESCRIPTION</b>					<b>(9)</b>
<b>Reading</b> –Reading editorials; and Opinion Blogs, Company profiles, Statement of Purpose (SOP); <b>Writing</b> –Essay Writing (Descriptive or Narrative), Job/Internship Application–Cover letter &Resume; <b>Grammar</b> –Numerical adjectives, Relative Clauses, <b>Vocabulary</b> -Cause &Effect Expressions–Content Vs Function words.						
<b>TOTAL: 45 PERIODS</b>						

<b>COURSE OUTCOMES:</b>													
<b>At the end of the course, the learners will be able to:</b>													
<b>COs</b>	<b>Course Outcome</b>											<b>Cognitive Level</b>	
CO1	Compare and contrast products and ideas in technical texts.											Analyse	
CO2	Interpret and comprehend the given texts and writing reports/paragraphs											Understand	
CO3	Analyze problems in order to arrive at feasible solutions and describe the product/process effectively.											Analyse	
CO4	Report events based on the Graphical representation and provide recommendations											Analyse	
CO5	Draft effective resumes for job/internships											Apply	
<b>TEXT BOOKS:</b>													
1. English for Engineers & Technologists, First edition, Orient Blackswan Private Ltd. Department of English, Anna University, 2020.													
2. Dr.KN. Shoba, and Dr.Lourdes Joevani, English for Science & Technology Cambridge University Press, Francis Department of English, Anna University, 2021.													
<b>REFERENCES:</b>													
1. Meenakshi Raman, Sangeeta Sharm, Technical Communication– Principles and Practices, Oxford University. Press, New Delhi, 2016.													
2. Lakshminarayanan, A Course Book on Technical English, SciTech Publications (India) Pvt. Ltd, 2012.													
3. Aysha Viswamohan, English for Technical Communication, McGraw Hill Education, 2008.													
4. KulbhusanKumar, RSSalaria, Effective Communication Skill, Khanna Publishing House, 2018.													
5. Dr.V.Chellammal, Learning to Communicate–Allied Publishing House, New Delhi, 2003.													
<b>Mapping of COs with POs and PSOs</b>													
<b>COs/ POs</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	<b>PO9</b>	<b>PO10</b>	<b>PO11</b>	<b>PSO1</b>	<b>PSO2</b>
CO1	-	-	-	-	-	-	-	2	3	-	3	-	-
CO2	-	-	-	-	-	-	-	2	3	-	3	-	-
CO3	-	-	-	-	-	-	-	2	3	-	3	-	-
CO4	-	-	-	-	-	-	-	2	3	-	3	-	-
CO5	-	-	-	-	-	-	-	2	3	-	3	-	-
Avg.	-	-	-	-	-	-	-	2	3	-	3	-	-
1-low, 2-medium, 3-high													

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24MET16	ENGINEERING DRAWING	Category	L	T	P	C
		ESC	2	0	4	4
<b>(Common to AE, ME &amp; SF)</b>						
<b>PREREQUISITE:</b>						
<p>Student must have the basic knowledge of geometry, trigonometry and algebra, along with an introduction to fundamental engineering concepts. Students should also possess knowledge on traditional drafting tools such as scales, compasses, and protractors. The ability to visualize and interpret three-dimensional objects from two-dimensional drawings.</p>						
<b>OBJECTIVES:</b>						
<ul style="list-style-type: none"> <li>• To understand the basic principles of engineering drawing and Engineering curves.</li> <li>• To impart knowledge on the projection of points, lines and plane surfaces.</li> <li>• To improve the visualization skills for better understanding of projection of solids</li> <li>• To develop the imaginative skills of the students required to understand Section of solids and developments of surfaces.</li> <li>• To make the students understand the viewing of Orthographic and Isometric projections.</li> </ul>						
<b>UNIT - I</b>	<b>PLANE CURVES</b>	<b>6 + 12 = 18</b>				
Introduction on drafting instruments, BIS conventions and specifications, Lettering and Dimensioning-Conics-Construction of ellipse, parabola and hyperbola by eccentricity method -Construction of cycloid-Construction of involutes-Drawing of tangents and normal to the above curves.						
<b>UNIT - II</b>	<b>PROJECTION OF POINTS, LINES AND PLANE SURFACES</b>	<b>6 + 12 = 18</b>				
Projection of points and straight lines located in the first quadrant inclined to both the planes -Determination of true lengths and true inclinations - Projection of polygonal surface and circular lamina inclined to any one reference plane.						
<b>UNIT - III</b>	<b>PROJECTION OF SOLIDS</b>	<b>6 + 12 = 18</b>				
Projection of simple solids like prisms, pyramids, cylinder and cone when the axis is inclined to one reference plane by change of position method.						
<b>UNIT - IV</b>	<b>SECTION OF SOLIDS AND DEVELOPMENT OF SURFACES</b>	<b>6 + 12 = 18</b>				
Sectioning of above solids in simple vertical position by cutting planes inclined to one reference plane and perpendicular to the other- Obtaining true shape of section. Development of lateral surfaces of simple and truncated solids-Prisms, pyramids, cylinders and cones.						
<b>UNIT - V</b>	<b>ORTHOGRAPHIC VIEWS AND ISOMETRIC PROJECTIONS</b>	<b>6 + 12 = 18</b>				
Introduction - Free hand sketching of multiple views from pictorial views of objects. Principle of Isometric projection – isometric projection of simple solids and truncated solids of prism, pyramid, cylinder and cone. Introduction to AutoCAD Practicing three-dimensional modeling of isometric projection of simple objects by CAD software. (Not for examination).						
<b>TOTAL: 90 PERIODS</b>						

<b>COURSE OUTCOMES:</b>														
<b>At the end of the course, the students will be able to:</b>														
<b>COs</b>	<b>Course Outcome</b>												<b>Cognitive Level</b>	
CO1	Gain knowledge on basic drafting convention and perform sketching of basic geometrical constructions of conic curves, involutes and cycloid.												<b>Understand</b>	
CO2	Draw the projection of points, lines and plane surfaces inclined to principal planes.												<b>Apply</b>	
CO3	Practicing projections of simple solids which are inclined to reference planes by change of position method.												<b>Apply</b>	
CO4	Construct sectional views and development of surfaces of simple and truncated solids												<b>Apply</b>	
CO5	Discover the orthographic and isometric views of the objects.												<b>Apply</b>	
<b>TEXT BOOKS:</b>														
<ol style="list-style-type: none"> <li>1. Natarajan, K.V., A text book of Engineering Graphics, Dhanalakshmi Publishers, Chennai, 2020.</li> <li>2. Kumar, M.S., Engineering Graphics, D.D. Publications, 2019.</li> </ol>														
<b>REFERENCES:</b>														
<ol style="list-style-type: none"> <li>1. Venugopal &amp; Prabhu Raja, V., Engineering Graphics, New Age International (P) Limited, 2009.</li> <li>2. Bhatt, N.D., Engineering Drawing, Charotar Publishing House, Fifty Third Edition, 2020.</li> <li>3. Shah, B., and Rana, B.C., Engineering Drawing, Pearson Education, 2009.</li> <li>4. Gopalakrishna, K.R., Engineering Drawing (Vol. I &amp; II), Subhas Publications, 2017.</li> <li>5. Basant Agarwal and Agarwal C.M., Engineering Drawing, Tata McGraw Hill Publishing Company Limited, 2019.</li> </ol>														
<b>Mapping of COs with POs and PSOs</b>														
<b>COs/ POs</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	<b>PO9</b>	<b>PO10</b>	<b>PO11</b>	<b>PSO1</b>	<b>PSO2</b>
CO1	2	2	2	2	2	-	-	-	2	-	-	2	1	-
CO2	2	2	2	2	2	-	-	-	2	-	-	2	1	-
CO3	2	2	3	3	2	-	-	-	2	-	-	2	1	-
CO4	3	2	3	2	3	-	-	-	2	-	-	2	1	-
CO5	3	3	3	3	3	-	-	-	2	-	-	2	1	-
Avg.	<b>2.4</b>	<b>2.2</b>	<b>2.6</b>	<b>2.4</b>	<b>2.4</b>	-	-	-	<b>2</b>	-	-	<b>2</b>	<b>1</b>	-
1-low, 2-medium, 3-high														

Chairman / BoS

24ITT16	PROGRAMMING FOR PROBLEM SOLVING	Category	L	T	P	C
		ESC	3	0	0	3
<b>(Common to AE, BME, CSE, CS, CSD, IOT, IT, ECE, EEE. MECH)</b>						
<b>PREREQUISITE:</b>						
Students must have basic computer literacy, including familiarity with operating systems, file management, and software usage. A Basic understanding of algorithms and flowcharts are required to design and visualize problem-solving strategies. Students must have basic knowledge on programming principles, such as variables, simple data types, control structures, problem solving and logical thinking skills.						
<b>OBJECTIVES:</b>						
<ul style="list-style-type: none"> <li>• To acquire knowledge on hardware, software and computer languages.</li> <li>• To recall and implement the fundamentals concepts in C program.</li> <li>• To assimilate Arrays and Functions.</li> <li>• To get insight on Strings and Pointers.</li> <li>• To explore the importance of Structures and Files.</li> </ul>						
<b>UNIT - I</b>	<b>INTRODUCTION TO COMPUTING AND C</b>					<b>(9)</b>
Introduction to Computing: Organization of computer – hardware and software – number system and conversions – representation of an algorithm: pseudo code, flowchart with examples. Introduction to C – features of C – structure of C program – character set – C tokens – keywords – identifiers – constants – variables – data types – operators – precedence and associativity.						
<b>UNIT - II</b>	<b>CONTROL STRUCTURES</b>					<b>(9)</b>
Decision Making and Branching: Introduction – decision making with if statement – simple if statement – if-else statement – nested if-else statements – if-else-if ladder statement – switch statement – goto statement – conditional operator – decision making and looping: introduction – while statement – do-while statement – for statement.						
<b>UNIT - III</b>	<b>FUNCTIONS AND ARRAY</b>					<b>(9)</b>
Functions: Declaration and definition – function prototype – parameter and arguments – return type – passing argument by value and by reference – function scope and lifetime – function pointer – arrays: array declaration and initialization – one dimensional array and two-dimensional array with example.						
<b>UNIT - IV</b>	<b>POINTERS AND STRINGS</b>					<b>(9)</b>
Pointers: Definition – initialization – pointers arithmetic – pointers to pointers – pointers and arrays. String: Declaring and initializing string variables – string handling functions and operations.						
<b>UNIT - V</b>	<b>STRUCTURE, UNION AND FILE</b>					<b>(9)</b>
Structures: Declaration – definition – structure within a structure – union – storage classes – preprocessor directives – Files: Defining and opening a file – closing a file – input/output operations on files – command line arguments.						
<b>TOTAL: 45 PERIODS</b>						



<b>COURSE OUTCOMES:</b>													
<b>At the end of the course, the learners will be able to:</b>													
<b>COs</b>	<b>Course Outcome</b>											<b>Cognitive Level</b>	
CO1	Identify and describe the fundamental components of computer systems and programming in C.											Understand	
CO2	Infer the concepts of basic structures in control statements.											Understand	
CO3	Imbibe the concepts of arrays and functions to effectively manage and process data in programming.											Understand	
CO4	Utilize pointers to handle memory and work with strings to manage text in their programs.											Apply	
CO5	Infer structures and unions to group different types of data and perform file operations to save and load data.											Apply	
<b>TEXT BOOKS:</b>													
1. Herbert Schildt, C - The Complete Reference, Tata McGraw-Hill, New Delhi, Fourth Edition, 2017.													
2. Byron S Gottfried and Jitendar Kumar Chhabra, “Programming with C”, Tata McGraw Hill Publishing Company, Third Edition, 2011.													
<b>REFERENCES:</b>													
1. Yashavant Kanetkar, “Let Us C: Authentic guide to C programming language”, BPB Publication, 19th Edition, 2022.													
2. Robert C. Seacord, “Effective C”, No Starch Press, 2020.													
3. E Balagurusamy, “Programming in Ansi C”, McGraw Hill Education, Eighth Edition, 2019.													
4. Ashok N.Kamathane, ‘Computer Programming, Pearson Education, India, Third Edition ,2015.													
5. <a href="https://archive.nptel.ac.in/courses/106/105/106105171/">https://archive.nptel.ac.in/courses/106/105/106105171/</a>													
<b>Mapping of COs with POs and PSOs</b>													
<b>COs/ POs</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	<b>PO9</b>	<b>PO10</b>	<b>PO11</b>	<b>PSO1</b>	<b>PSO2</b>
CO1	3	3	2	3	3	1	–	–	–	–	–	–	–
CO2	3	2	2	3	3	1	–	–	–	–	–	–	–
CO3	2	3	2	2	3	1	–	–	–	–	–	–	–
CO4	3	3	2	3	2	1	–	–	–	–	–	–	–
CO5	3	2	2	2	3	1	–	–	–	–	–	–	–
Avg.	<b>2.8</b>	<b>2.6</b>	<b>2</b>	<b>2.6</b>	<b>2.8</b>	<b>1</b>	–	–	–	–	–	–	–
1-low, 2-medium, 3-high													

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24GET19	தமிழர் மரபு	CATEGORY	L	T	P	C
		HSMC	1	0	0	1
(அனைத்து துறைகளுக்கும் பொதுவானது)						
முன் கூட்டிய துறை சார்அறிவு : தேவை இல்லை						
அலகு - I	மொழி மற்றும் இலக்கியம்	(03)				
இந்திய மொழிக் குடும்பங்கள் - திராவிடமொழிகள் - தமிழ் ஒரு செம்மொழி - தமிழ் செவ்விலயக்கிகியங்கள்-சங்க இலக்கியத்தின்சமயச் சார்பற்றதன்மை - சங்க இலக்கியத்தில் பகிர்தல் அறம் - திருக்குறளில் மேலாண்மைக் கருத்துக்கள்-தமிழ்காப்பியங்கள், தமிழகத்தில் சமண பௌத்த சமயங்களின் தாக்கம்-பக்தி இலக்கியம், ஆழ்வார்கள் மற்றும் நாயன்மார்கள் - சிற்றிலகியங்கள் தமிழில் நவீன இலக்கியத்தின் வளர்ச்சி-தமிழ் இலக்கிய வளர்ச்சியில் பாரதியார் மற்றும் பாரதிதாசன் ஆகியோரின் பங்களிப்பு.						
அலகு - II	மரபு - பாறை ஓவியங்கள் முதல் நவீன ஓவியங்கள் வரை - சிற்பக் கலை	(03)				
நடுகல் முதல் நவீன சிற்பங்கள் வரை - ஐம்பொன் சிலைகள் - பழங்குடியினர் மற்றும் அவர்கள் தயாரிக்கும் கைவினைப்பொருட்கள், பொம்மைகள் - தேர்செய்யும்கலை - சுடுமண்சிற்பங்கள் - நாட்டுப்புறத் தெய்வங்கள்-குமரி முனியில் திருவள்ளூர் சிலை - இசைகருவிகள் - மிருதங்கம், பறை. வீணை. யாழ். நாதஸ்வரம்-தமிழர்களின் சமூக பொருளாதார வாழ்வில் கோவில்களின் பங்கு.						
அலகு - III	நாட்டுப் புறக்கலைகள் மற்றும் வீர விளையாட்டுக்கள்	(03)				
தெருக்கூத்து, கரகாட்டம், வில்லுப்பாட்டு, கணியான்கூத்து, ஓயிலாட்டம், தோல்பாவைக்கூத்து, சிலம்பாட்டம், வளரி, புலியாட்டம், தமிழர்களின் விளையாட்டுகள்.						
அலகு - IV	தமிழர்களின் திணைக் கோட்பாடுகள்	(03)				
தமிழகத்தின் தாவரங்களும், விலங்குகளும் - தொல்காப்பியம் மற்றும் சங்க இலக்கியத்தில் அகம் மற்றும் புறக்கோட்பாடுகள்-தமிழர்கள் போற்றிய அறக்கோட்பாடு- சங்கக்காலத்தில் தமிழகத்தில் எழுத்தறிவும் கல்வியும்-சங்ககாலநகரங்களும் துறைமுகங்களும்-சங்ககாலத்தில்ஏற்றுமதி மற்றும் இறக்குமதி-கடல்கடந்த நாடுகளில் சோழர்களின் வெற்றி.						
அலகு - V	இந்திய தேசிய இயக்கம் மற்றும் இந்திய பண்பாட்டிற்குத் தமிழர்களின் பங்களிப்பு	(03)				
இந்திய விடுதலைப்போரில் தமிழர்களின் பங்கு-இந்தியாவின் பிற்பகுதிகளில் தமிழ்பண்பாட்டின் தாக்கம்-சுயமரியாதை இயக்கம்-இந்திய மருத்துவத்தில்சித்தமருத்துவத்தின்பங்கு கல்வெட்டுகள் கையெழுத்துப்படிக்கள் - தமிழ்ப் புத்தகங்கள்களின் அச்ச வரலாறு.						

TOTAL: 15 PERIODS													
பாடம் கற்றத்தின் விளைவுகள்: பாடத்தை வெற்றிகரமாக கற்று முடித்த பின்பு, மாணவர்களால் முடியும் விளைவுகள்												அறிவாற்றல் நிலை	
CO1:	தமிழ் மொழியின் செந்தன்மை மற்றும் இலக்கியம் குறித்த தெரிதல்										புரிதல்		
CO2:	தமிழர்களின் சிற்பக் கலை, ஓவியக் கலை மற்றும் இசைக் கருவிகள் குறித்த தெளிவு										புரிதல்		
CO3:	தமிழர்களின் நாட்டுப்புரைக்கலைகள் மற்றும் வீரவிளையாட்டுகள் குறித்த தெளிவு										புரிதல்		
CO4:	தமிழர்களின்திணைக்கோட்பாடுகள், சங்ககாலவணிகம் மற்றும் சோழர்களின் வெற்றிகள் குறித்த தகவல்கள்.										புரிதல்		
CO5:	இந்திய தேசிய இயக்கம், சுயமரியாதை இயக்கம் மற்றும் சித்த மருத்தவம் பற்றிய புரிதல்.										புரிதல்		
<b>Text Books:</b>													
1. தமிழக வரலாறு – மக்களும் பண்பாடும்-கேகேபிள்ளை(வெளியீடு தமிழ்நாடு பாடநூல் மற்றும் கல்வியில் பணிகள் கழகம்), உலகத் தமிழாராய்ச்சி நிறுவனம், சென்னை, <b>2002</b> 2. கணினித்தமிழ் முனைவர் இல. சுந்தரம், விகடன் பிரசுரம், 2016													
<b>Reference Books:</b>													
1. கீழடி- வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம்.(தொல்லியல் துறை வெளியீடு) 2. பொருளை- ஆற்றங்கரை நாகரிகம் (தொல்லியல் துறை வெளியீடு) 3. Social Life of Tamils (Dr.K.K.Pillay) A joint Publication of TNTB & ESC and RMRL 4. Social Life of the Tamils – The Classical Period (Dr.S.Sigaravelu) (Published by: International Institute of Tamil Studies).													
<b>Mapping of COs with POs and PSOs</b>													
COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	-	-	-	-	-	-	3	3	-	2	-	-	-
CO2	-	-	-	-	-	-	3	3	-	2	-	-	-
CO3	-	-	-	-	-	-	3	3	-	2	-	-	-
CO4	-	-	-	-	-	-	3	3	-	2	-	-	-
CO5	-	-	-	-	-	-	3	3	-	2	-	-	-
<b>Avg.</b>	-	-	-	-	-	-	<b>3</b>	<b>3</b>	-	<b>2</b>	-	-	-
1. சிறிது 2. மிதமான 3. கணிசமான													

Chairman / BoS

24MAI19	MATRICES & CALCULUS	Category	L	T	P	C
		BSC	2	1	2	4
<b>(Common to All Branches)</b>						
<b>PREREQUISITE</b>						
The students must have the knowledge on the basic concepts of Matrices and its applications, differential equations, differentiation, integration, partial derivatives and vector algebra and basic computer knowledge.						
<b>OBJECTIVES:</b>						
<ul style="list-style-type: none"> <li>• To understand the concepts of eigenvalues, eigenvectors and quadratic forms.</li> <li>• To familiarize students how to solve the higher-order linear differential equations.</li> <li>• To develop the skill on the geometric properties of curves using differential calculus.</li> <li>• To equip students to analyze and optimize the functions of several variables.</li> <li>• To apply vector calculus and its principles to evaluate vector fields.</li> </ul>						
<b>UNIT - I</b>	<b>LINEAR ALGEBRA</b>					<b>(9)</b>
Characteristic equation – Eigen values and Eigen vectors of a real matrix – Properties of Eigen values and Eigen vectors (Excluding proof) – Cayley Hamilton theorem (excluding proof) – Quadratic forms – Reduction of quadratic form to canonical form by orthogonal transformation.						
<b>UNIT - II</b>	<b>ORDINARY DIFFERENTIAL EQUATIONS</b>					<b>(9)</b>
Linear differential equations of second and higher order with constant coefficients – Differential equations with variable coefficients – Cauchy’s and Legendre’s linear equations – Method of variation of parameters.						
<b>UNIT - III</b>	<b>DIFFERENTIAL CALCULUS</b>					<b>(9)</b>
Curvature - Radius of curvature (Cartesian co-ordinates only) – Centre of curvature and Circle of curvature – Involutives and Evolutes (Parabola, Ellipse, Hyperbola and Rectangular hyperbola ).						
<b>UNIT - IV</b>	<b>FUNCTIONS OF SEVERAL VARIABLES</b>					<b>(9)</b>
Partial derivatives – Euler’s theorem for homogenous functions – Taylor’s series expansion - Maxima and Minima for functions of two variables – Method of Lagrangian multipliers.						
<b>UNIT - V</b>	<b>VECTOR CALCULUS</b>					<b>(9)</b>
Gradient, Divergence and Curl – Directional derivative – Irrotational and solenoidal vector fields – Green’s theorem in plane, Gauss divergence theorem and Stoke’s theorem (Cube, Cuboid and Rectangular Paralleopiped only).						
<b>List of Exercise/Experiments (MAT LAB):</b>						
<ol style="list-style-type: none"> <li>1. Calculate the characteristic equation and eigen values</li> <li>2. Find the eigenvector and diagonalization of a given matrix.</li> <li>3. Solving ODE with constant coefficients</li> <li>4. Detect the solution of ODE with variable coefficients</li> <li>5. Identify the radius of curvature</li> <li>6. Establish the evolutes of curve.</li> <li>7. Reckon the Taylor’s series for functions of two variables.</li> <li>8. Compute the maxima and minima.</li> </ol>						

9. Estimate the directional derivative, divergence and curl.  
10. Determine line integral, surface integral and volume integral.

**Lecture: 45 Laboratory: 30 TOTAL: 75 PERIODS**

**COURSE OUTCOMES:**

**At the end of the course, the students will be able to:**

COs	Course Outcome	Cognitive Level
CO1	Assimilate the eigen values and eigen vectors in reduction of quadratic form into canonical form.	Apply
CO2	Solve higher-order linear differential equations with constant and variable coefficients.	Understand
CO3	Analyse the center of curvature, circle of curvature and develop the evolutes.	Understand
CO4	Expand the Taylor series and calculate the extremum value for function of several variables.	Apply
CO5	Apply the divergence and curl in vector integral theorems of vector fields.	Apply

**TEXT BOOKS:**

- Ravish R Singh and Mukul Bhatt, “Engineering Mathematics – I”, Mc-Graw Hill Publications, New Delhi, 2<sup>nd</sup> Edition, 2020.
- B. S. Grewal, “Higher Engineering Mathematics”, Khanna Publishers, New Delhi, 40<sup>th</sup> Edition, 2020.

**REFERENCES:**

- Bali N. P and Manish Goyal, “Engineering Mathematics”, Laxmi Publications Pvt Ltd., 7<sup>th</sup> Edition, 2020.
- Dass H.K, “Advance Engineering Mathematics”, S. Chand and company, 11<sup>th</sup> Edition, 2014.
- Jain R.K. and Iyengar S.R.K, “Advanced Engineering Mathematics”, Narosa Publications, 8<sup>th</sup> Edition, 2012.
- Erwin Kreyszig, “Advanced Engineering Mathematics”, Wiley India, New Delhi, 10<sup>th</sup> Edition 2016.
- <https://archive.nptel.ac.in/courses/111/108/111108157/>
- <https://archive.nptel.ac.in/courses/111/105/111105122/>

**Mapping of COs with POs and PSOs**

COs / POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	3	3	3	2	1	-	-	-	-	1	-	-
CO2	3	3	3	3	2	1	-	-	-	-	1	-	-
CO3	3	3	3	3	2	1	-	-	-	-	1	-	-
CO4	3	3	3	3	2	1	-	-	-	-	1	-	-
CO5	3	3	3	3	2	1	-	-	-	-	1	-	-
Avg.	3	3	3	3	2	1	-	-	-	-	1	-	-

1-low, 2-medium, 3-high

**Chairman / BoS**

24PHI06	APPLIED PHYSICS	Category	L	T	P	C
		BSC	3	0	2	4
(Common to AE, CE, ME & SFE)						
<b>PREREQUISITE:</b>						
The students must have knowledge about basic concepts of sound, light, arrangement of atoms in crystalline solids, modern engineering materials, magnetic and super conducting materials and their applications.						
<b>OBJECTIVES:</b>						
<ul style="list-style-type: none"> <li>• To compute and analyze various problems applicable to engineering physics.</li> <li>• To inculcate the prime concepts, propagation and industrial applications of sound wave.</li> <li>• To comprehend the fundamentals of crystal physics thereby exploring it for potential engineering applications.</li> <li>• To emphasize the basic concepts of new engineering materials.</li> <li>• To assimilate the different types of magnetic material and its applications in the field of engineering.</li> </ul>						
<b>UNIT – I</b>	<b>ACOUSTICS AND ULTRASONICS</b>	<b>(9)</b>				
Acoustics–Introduction – classification of sound – characteristics of musical sound – loudness – Weber – Fechner law – decibel – absorption co-efficient – reverberation – reverberation time – Sabine’s formula: growth and decay (derivation) – factors affecting acoustics of buildings and their remedies. Ultrasonics – production – Piezoelectric method – properties – velocity measurement: acoustical grating – applications – SONAR, NDT – ultrasonic flaw detection technique.						
<b>UNIT – II</b>	<b>LASER TECHNOLOGY</b>	<b>(9)</b>				
Introduction – principle of spontaneous emission and stimulated emission – Einstein’s co-efficient A & B(derivation) – population inversion, pumping – types of lasers – molecular beam laser (CO <sub>2</sub> ) and homo – junction and hetero – junction semiconductor lasers (qualitative analysis only) – industrial applications: lasers in welding, heat treatment and cutting – holography (construction and reconstruction of images).						
<b>UNIT – III</b>	<b>CRYSTAL PHYSICS</b>	<b>(9)</b>				
Introduction to crystalline and amorphous solids – lattice and unit cell – seven crystal systems and Bravais lattices – Miller indices(hkl) – d-spacing in cubic lattice – atomic radius – co-ordination number – packing factor of SC, BCC, FCC and HCP structures – crystal defects – point, line and surface defects.						
<b>UNIT – IV</b>	<b>MODERN ENGINEERING MATERILAS</b>	<b>(9)</b>				
New engineering materials: Metallic glasses – preparation, properties and applications – Shape memory alloys (SMA) – characteristics, properties of Ni-Ti alloy – applications – advantages and disadvantages of SMA. Smart materials –smart fluids –electrorheological fluids (ERF)–magnetorheological fluids (MRF) – effect of temperature in fluids and its applications.						
<b>UNIT - V</b>	<b>MAGNETIC AND SUPERCONDUCTING MATERIALS</b>	<b>(9)</b>				
<b>Magnetic Materials:</b> Introduction – origin of magnetic moment – dia, para and ferromagnetic martials – domain theory of ferro-magnetism – Hysteresis – soft and hard magnetic materials.						
<b>Superconducting Materials:</b> Introduction to superconductivity – properties and types of superconductors – application of superconductors: magnetic levitation–SQUIDS – cryotron.						
<b>List of exercises/experiments:</b>						
1. Determine the frequency of sound waves using sonometer.						
2. Calculate the velocity of ultrasonic waves and compressibility of the given liquid using Ultrasonic interferometer.						
3.By forming interference fringes, determine the width of one fringe and hence calculate the thickness of the given thin paper.						
4. For a given optical fibre determine the acceptance angle and numerical aperture.						
5. Compute the band gap of an intrinsic semiconductor.						
6. Evaluate the wave length of a semiconductor laser.						
7. Enumerate the viscosity of a given liquid by Poiseuille’s method.						
8. Using non – uniform bending method calculate the Young’s modulus of the given beam.						

9. By forming B-H curve calculate Hysteresis loss of magnetic materials.  
10. Employing semiconductor laser compute the width of the groove of CD.

**Lecture: 45 Laboratory: 30 TOTAL: 75 PERIODS**

**Course outcomes:**

**At the end of the course, the students will be able to:**

COs	Course Outcome	Cognitive level
CO1	Describe the impact of engineering solutions in the constructional and designing environment.	Understand
CO2	Categorize the types of laser and utilize it for specific application based on their desirable requisite.	Analyze
CO3	Utilize the conceived concepts and techniques for synthesizing novel crystals with enhanced multifunctional properties.	Apply
CO4	Enumerate the preambles of modern engineering materials and implement its concepts to tackle the cumbersome new engineering materials.	Apply
CO5	Imbibe the concepts of magnetic and superconducting phenomenon that can be applied for possible technological and engineering applications.	Apply

**Text Books:**

- M.N. Avadhanulu and P.G. Kshirsagar, “A text book of Engineering Physics”, S. Chand and Company, New Delhi, 11 th Edition, 2018.
- R.K. Gaur & S.L. Gupta, “Engineering Physics”, Dhanpat Rai Publication, New Delhi, 7 th Edition, 2014.

**Reference Books:**

- R. Murugesan and Kiruthiga Sivaprasath, “Modern Physics”, S. Chand & Company, New Delhi, 17th Edition, 2014.
- V. Rajendran, “Engineering Physics”, Tata McGraw-Hill, New Delhi, 1 st Edition, 2011.
- S.O. Pillai, “Solid State Physics”, New Age Publication, Chennai, 10 th Edition, 2023.
- Arthur Beiser, Shobhit Mahajan, S. Rai Choudhury, “Concepts of Modern Physics”, McGraw-Hill, New Delhi, 7 th Edition, 2015.

**Mapping of COs with POs and PSOs**

COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	2	-	-	2	-	1	-	2	-	2	-	-
CO2	3	2	-	-	2	-	1	-	2	-	2	-	-
CO3	3	2	-	-	2	-	-	-	2	-	2	-	-
CO4	3	2	-	-	2	-	1	-	2	-	2	-	-
CO5	3	2	-	-	2	-	1	-	2	-	2	-	-
<b>Avg.</b>	<b>3</b>	<b>2</b>	<b>-</b>	<b>-</b>	<b>2</b>		<b>0.8</b>	<b>-</b>	<b>2</b>	<b>-</b>	<b>2</b>	<b>-</b>	<b>-</b>

1-low, 2-medium, 3-high

**Chairman / BoS**

24ITP16	PROGRAMMING FOR PROBLEM SOLVING LABORATORY	Category	L	T	P	C
		ESC	0	0	2	1
<b>(Common to AUTO, BME, CSE, CSE(CS), CSD, CSE(IoT), IT, ECE, EEE, MECH)</b>						
<b>PREREQUISITE:</b>						
Students must have basic knowledge on programming principles, such as variables, simple data types, control structures, problem solving and logical thinking skills.						
<b>OBJECTIVES:</b>						
<ul style="list-style-type: none"> <li>• To learn the basic of MS word, Excel, Power Point presentation and MS Access.</li> <li>• To articulate how to develop a program with a desired runtime execution flow.</li> <li>• To develop computer programs using C basics concepts.</li> <li>• To get familiarity on functions, strings and pointers.</li> <li>• To acquire and apply the file manipulation</li> </ul>						
<b>List of Experiments:</b>						
<ol style="list-style-type: none"> <li>1. Prepare a Bio-data using MS Word with appropriate page, text and table formatting options and send the same to too many recipients using mail merge.</li> <li>2. Prepare a mark sheet with five subjects for five students in MS Excel File using Formulas, Functions and charts.</li> <li>3. i) Prepare a Power Point presentation for your organization with varying animation effects using timer. ii) Prepare a Student Database in MS Access, manipulate the data and generate report.</li> <li>4. Programs using I/O statements and expressions.</li> <li>5. Design an algorithm and flowchart with example.</li> <li>6. Programs using decision-making constructs: if-else, goto, switch-case, break-continue.</li> <li>7. Loops: for, while, do-while.</li> <li>8. Arrays: 1D and 2D</li> <li>9. Strings: operations</li> <li>10. Functions: passing parameters by (value, reference), Recursion</li> <li>11. Pointers and structures</li> <li>12. File operations.</li> </ol>						
<b>TOTAL: 30 PERIODS</b>						
<b>COURSE OUTCOMES:</b>						
<b>At the end of the course, the students will be able to:</b>						
COs	Course Outcome					Cognitive Level
CO1	Interpret the basic concept of MS word, Excel, Power Point presentation and MS Access and C programming.					Apply
CO2	Develop the program using the concept of control statements.					Apply
CO3	Demonstrate the use of functions and arrays in Programming.					Apply
CO4	Apply the concepts of pointers and structures.					Apply
CO5	Develop the program using the file and string operations.					Apply
<b>REFERENCES:</b>						
<ol style="list-style-type: none"> <li>1. Jeff Szuha, “Learn C Programming”, Packt Publishing, United Kingdom, Second Edition, 2022.</li> <li>2. E Balagurusamy, “Programming in Ansi C”, McGraw Hill Education, Eight Edition, 2019.</li> </ol>						



Mapping of COs with POs and PSOs													
COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	3	2	3	3	1	–	–	–	–	–	–	–
CO2	3	3	2	3	3	1	–	–	–	–	–	–	–
CO3	3	3	2	2	3	1	–	–	–	–	–	–	–
CO4	3	3	2	3	3	1	–	–	–	–	–	–	–
CO5	3	3	2	2	3	1	–	–	–	–	–	–	–
<b>Avg.</b>	<b>3</b>	<b>3</b>	<b>2</b>	<b>2</b>	<b>3</b>	<b>1</b>	–	–	–	–	–	–	–
1-low, 2-medium, 3-high													

Chairman / BoS

24GEP17	MANUFACTURING PRACTICES LABORATORY	Category	L	T	P	C
		ESC	0	0	2	1
<b>(Common to AE, CE, MECH &amp; SFE)</b>						
<b>PREREQUISITE:</b>						
Students must have a basic knowledge on the topics from Civil works and Mechanical Engineering such as Plumbing, Carpentry, Welding, Machining and Electrical & Electronics basic components.						
<b>OBJECTIVES:</b>						
<ul style="list-style-type: none"> <li>• To provide students with hands-on experience on various basic engineering practices in mechanical engineering.</li> <li>• To make the students understand all the fundamental concepts involving Plumbing and Carpentry work.</li> <li>• To know the different welding processes and sheet metal work procedures practically.</li> <li>• To learn the operation of basic machining of simple facing and turning using lathe.</li> <li>• To acquire the basic operation of ceiling fan, iron box and logic gates.</li> </ul>						
<b>List of Exercise/Experiments:</b>						
<b>GROUP A (CIVIL)</b>			<b>(12)</b>			
<b>PLUMBING WORK</b>						
<ol style="list-style-type: none"> <li>1. Preparing plumbing line sketches</li> <li>2. Connecting various basic pipe fittings like valves, taps, coupling, unions, reducers, Elbows and other components which are commonly used in household.</li> </ol>						
<b>CARPENTRY WORK</b>						
<ol style="list-style-type: none"> <li>3. Sawing and planing work</li> <li>4. Making joints like T-Joint, Mortise joint and Tenon joint and Dovetail joint.</li> </ol>						
<b>GROUP B (MECHANICAL)</b>			<b>(14)</b>			
<b>WELDING WORK</b>						
<ol style="list-style-type: none"> <li>5. Welding of Butt Joints, Lap Joints, and Tee Joints using arc welding.</li> </ol>						
<b>BASIC MACHINING WORK</b>						
<ol style="list-style-type: none"> <li>6. Simple Facing and Turning operation using center lathe.</li> <li>7. Drilling and Tapping using drilling machine</li> </ol>						
<b>SHEET METAL WORK</b>						
<ol style="list-style-type: none"> <li>8. Making of a square tray</li> </ol>						
<b>GROUP C (ELECTRICAL &amp; ELECTRONICS)</b>			<b>(04)</b>			
<ol style="list-style-type: none"> <li>9. Study of Ceiling Fan and Iron Box</li> <li>10. Study of logic gates AND, OR, EX-OR and NOT.</li> </ol>						
<b>TOTAL: 30 PERIODS</b>						

<b>COURSE OUTCOMES:</b>													
<b>At the end of the course, the students will be able to:</b>													
<b>COs</b>	<b>Course Outcome</b>											<b>Cognitive Level</b>	
CO1	Draw pipe line plan, lay and connect various pipe fittings used in common house hold plumbing work.											Apply	
CO2	Make joints in wood materials used in common household wood work											Apply	
CO3	Weld various joints in steel plates using arc welding work											Apply	
CO4	Make use of lathe and drilling machine for turning, drilling and tapping.											Apply	
CO5	Interpret the key components and basic functions of a ceiling fan, iron box and logic gates.											Understand	
<b>REFERENCES:</b>													
1. Dr. V. Ramesh Babu. Engineering Practices Laboratory Manual, VRB Publishers, Revised Edition 2019-2020.													
2. S Gowri & T Jeyapoovan Engineering Practices Lab Manual, Vikas Publishing,5th Edition.													
<b>Mapping of COs with POs and PSOs</b>													
<b>COs/ POs</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	<b>PO9</b>	<b>PO10</b>	<b>PO11</b>	<b>PSO1</b>	<b>PSO2</b>
CO1	3	3	2	3	-	-	2	3	-	-	3	-	1
CO2	3	3	2	3	-	-	2	3	-	-	3	-	1
CO3	3	3	3	3	-	-	2	3	-	-	3	-	1
CO4	3	3	3	3	-	-	2	3	-	-	3	-	1
CO5	3	3	3	3	-	-	2	3	-	-	3	-	1
Avg.	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	-	-	<b>2</b>	<b>3</b>	-	-	<b>3</b>	-	<b>1</b>

Chairman / BoS

24SSP19	APTITUDE AND CODING SKILLS – I	Category	L	T	P	C
		EEC	0	0	2	1
<b>(Common to All Branches)</b>						
<b>OBJECTIVES:</b>						
<ul style="list-style-type: none"> <li>• To introduce the students about Aptitude</li> <li>• To expose to the Needs of Aptitude and its importance</li> <li>• To solve the problem and to improve analytical skill based on company specific skill</li> <li>• To introduce advanced topics including pointers, user-defined data types, and memory management.</li> <li>• To explore and apply the concepts of linked lists, stacks, and queues in problem-solving.</li> </ul>						
<b>UNIT - I</b>	<b>BASIC OF NUMBER SYSTEMS &amp; FOUNDATION</b>					(6)
Introduction to Number System and its Classification - Divisibility Rules and Problems –Place Value & Face Value - HCF & LCM and its properties.						
<b>UNIT - II</b>	<b>BASICS OF SHARE BASED CONCEPTS</b>					(6)
Introduction to Average –Basics of Ratio and proportion – Basics of Partnership–Introduction to Percentage.						
<b>UNIT - III</b>	<b>LOGICAL REASONING</b>					(4)
Analogies - Alpha and numeric series - Number Series - Coding and Decoding - Direction and distance.						
<b>UNIT - IV</b>	<b>VERBAL ABILITY</b>					(7)
Introduction to Grammar – Tenses – Parts of Speech – Preposition – Articles – Modal Verbs.						
<b>UNIT - V</b>	<b>C PROGRAMMING</b>					(7)
C Basics-Control Statements Decision making – Functions – Arrays & Strings – Pointers - User Defined Data Types - Storage Classes - Memory Management - Preprocessor.						
<b>TOTAL: 30 PERIODS</b>						
<b>COURSE OUTCOMES:</b>						
<b>At the end of the course, the students will be able to:</b>						
COs	Course Outcome					Cognitive Level
CO1	Develop problem-solving skills and identify optimal solutions efficiently.					Understanding
CO2	Solve problems on quantitative aptitude					Applying
CO3	Resolve problems with logical reasoning					Applying
CO4	Develop proficiency in verbal and communication for improved and effective articulation of ideas.					Applying
CO5	Implement C coding with appropriate data structures and pointers.					Applying
<b>TEXT BOOKS:</b>						
<ol style="list-style-type: none"> <li>1. R S Aggarwal, Quantitative Aptitude for Competitive Examinations.</li> <li>2. R.S. Aggarwal, A Modern Approach to Verbal &amp; Non-Verbal Reasoning</li> <li>3. Wren &amp; Martin, High School English Grammar &amp; Composition</li> <li>4. Brian W. Kernighan and Dennis Ritchie, The C Programming Language 2e, Pearson Education, 2015.</li> <li>5. Yashavant Kanetkar, The C Programming Language 2e, BPB publications,15<sup>th</sup> Edition, 2016</li> </ol>						

**REFERENCES:**

1. <https://www.geeksforgeeks.org/quantitative-aptitude/?ref=shm>
2. Stephen G. Kochana, Programming in C, 3<sup>rd</sup> Edition.
3. K. N. King, C Programming: A Modern Approach, 2e, 2008.
4. Aaron M. Tenenbaum, Yedidyah Langsam, and Moshe J. Augenstein, Data Structures Using C, Pearson Education India, 1990.
5. Robert L. Kruse and Bruce P. Leung, Data Structures and Program Design in C, Pearson Education 2007.
6. <https://www.geeksforgeeks.org/c-programming-language/>
7. <https://www.geeksforgeeks.org/data-structures/>

**Mapping of COs with POs and PSOs**

COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	3	3	-	3	3	-	3	1	-	3	-	-
CO2	3	3	3	-	3	3	-	3	1	-	3	-	-
CO3	3	3	3	-	3	3	-	3	3	-	3	-	-
CO4	-	-	-	-	3	3	-	3	3	-	3	-	-
CO5	3	3	3	-	3	3	-	3	2	-	3	-	-
Avg.	<b>2.4</b>	<b>2.4</b>	<b>2.4</b>	-	<b>3</b>	<b>3</b>	-	<b>3</b>	<b>2</b>	-	<b>3</b>	-	-

**Chairman / BoS**

24CST29	PYTHON PROGRAMMING	Category	L	T	P	C
		ESC	3	0	0	3
<b>(Common to All Branches)</b>						
<b>PREREQUISITE:</b>						
A basic understanding of programming principles such as variables and loops, paired with good problem-solving abilities, is required. Logical thinking and analytical skills are critical for effective programming.						
<b>OBJECTIVES:</b>						
<ul style="list-style-type: none"> <li>• To introduce the fundamental concepts of Python programming, including variables, control structures and functions.</li> <li>• To teach string manipulation, data structures, and exception handling in Python.</li> <li>• To establish a solid understanding of object-oriented programming in Python, covering inheritance, polymorphism, and operator overloading.</li> <li>• To enable students to perform file operations and manage databases using Python.</li> <li>• To introduce web programming and GUI development in Python using Django and Tkinter frameworks.</li> </ul>						
<b>UNIT – I</b>	<b>FUNDAMENTALS OF PYTHON</b>					<b>(9)</b>
Introduction to Python – Advantages of Python programming – Variables and Data types – Comments – Indentation– I/O function –Operators – Selection control structures – Looping control structures – Functions: Declaration – Types of arguments – Anonymous functions: Lambda.						
<b>UNIT – II</b>	<b>HANDLING STRINGS AND EXCEPTIONS</b>					<b>(9)</b>
Strings – List – Tuples – Dictionaries– Sets – Exception Handling: Built-in Exceptions – User-defined exception– Modules and Packages.						
<b>UNIT – III</b>	<b>OBJECT ORIENTED PROGRAMMING CONCEPTS</b>					<b>(9)</b>
Object Oriented Programming basics –Inheritance and Polymorphism – Operator Overloading and Overriding – Get and Set Attribute Values – Name Mangling –Duck Typing – Relationships.						
<b>UNIT–IV</b>	<b>FILES AND DATA BASES</b>					<b>(9)</b>
File I/O operations – Directory Operations – Reading and Writing in Structured Files: CSV and JSON – Data manipulation using MySQL.						
<b>UNIT – V</b>	<b>WEBPROGRAMINGAND GUI USING PYTHON</b>					<b>(9)</b>
Frameworks: Introduction to Django – Django CRUD– Socket Programming– Sending email –UI design: Tkinter – Events– CGI: Introduction to CGI Programming, GET and POST Methods.						
<b>TOTAL: 45 PERIODS</b>						

<b>COURSE OUTCOMES:</b>													
<b>At the end of the course, the students will be able to:</b>													
<b>COs</b>	<b>Course Outcome</b>											<b>Cognitive Level</b>	
CO1	Infer Python syntax to write code, using data types, operators, loops and conditionals.											Understand	
CO2	Interpret string manipulation, data structures and exception handling to build robust applications.											Understand	
CO3	Implement object-oriented programming principles, such as inheritance and polymorphism, to design effective solutions.											Apply	
CO4	Make use of file I/O operations and database management techniques to manage and manipulate data efficiently.											Apply	
CO5	Develop web applications and graphical user interfaces using Python frameworks and libraries											Apply	
<b>TEXT BOOKS:</b>													
1. Yashwant Kanetkar, Aditya Kanetkar, “Let Us Python”, BPB Publications, 5th Edition ,2023													
2. Wesley J.Chun, “Core Python Programming”, Pearson Education, 2nd Edition, 2017													
<b>REFERENCES:</b>													
1. Robert Oliver, “Python Quick Start Guide: The Simplified Beginner's Guide to Python Programming Using Hands-On Projects and Real-World Applications”, Clyde Bank Media LLC,1st Edition, 2023.													
2. Allen B. Downey, “Think Python”, O’Reilly Media, 2nd Edition, 2016.													
3. David Beazley, Brian K. Jones, “Python Cookbook”, O’Reilly Media, 3rd Edition, 2013.													
4. Mark Lutz, “Python Pocket Reference”, O’Reilly Media,5th Edition, 2014.													
5. www.python.org													
6. <a href="https://onlinecourses.swayam2.ac.in/cec22_cs20/preview">https://onlinecourses.swayam2.ac.in/cec22_cs20/preview</a>													
<b>Mapping of COs with POs and PSOs</b>													
<b>COs/ POs</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	<b>PO9</b>	<b>PO10</b>	<b>PO11</b>	<b>PSO1</b>	<b>PSO 2</b>
<b>CO1</b>	3	3	2	2	1	-	-	1	-	-	3	-	-
<b>CO2</b>	3	3	3	2	2	-	-	1	-	-	3	-	-
<b>CO3</b>	3	3	3	2	2	-	-	1	-	-	3	-	-
<b>CO4</b>	3	3	3	3	2	-	-	1	-	-	2	-	-
<b>CO5</b>	3	3	3	3	2	-	-	1	-	-	2	-	-
<b>Avg.</b>	<b>3</b>	<b>3</b>	<b>2.8</b>	<b>2.4</b>	<b>1.8</b>	<b>-</b>	<b>-</b>	<b>1</b>	<b>-</b>	<b>-</b>	<b>2.6</b>	<b>-</b>	<b>-</b>
1-low, 2-medium, 3-high													

Chairman / BoS

24MET26	DESIGN THINKING	Category	L	T	P	C
		PCC	2	0	0	2
<b>PRE-REQUISITE</b>						
Students are expected to have an empathetic mindset to help them understand users, a curious mindset to explore and questions assumptions, a collaborative mindset for interdisciplinary teamwork, an iterative approach for refining ideas and creativity to generate innovative solutions						
<b>Objectives</b>						
<ul style="list-style-type: none"> <li>• Learn Design Thinking concepts and principles</li> <li>• Understand the importance of the Design Mind</li> <li>• Use Design Thinking methods in every stage of problem solving</li> <li>• Learn the different phases of Design Thinking</li> <li>• Learn and apply various Design Thinking tools</li> </ul>						
<b>UNIT - I</b>	<b>FUNDAMENTALS OF DESIGN THINKING</b>					<b>(6)</b>
What is Design Thinking? - When to use Design Thinking? - How to do it? - Who are involved in this? – Design The Thinking™– Personal Visualization, The Wheel of Life & Balancing Priorities – Appreciating ‘Design’ – The 3 Laws of Design Thinking.						
<b>UNIT - II</b>	<b>STEP 1: THE ‘FEEL’ STAGE</b>					<b>(6)</b>
What is this stage about? – What role does a Design Thinker play in this stage? Tools – What is the purpose in this stage? – Persona – Journey Mapping – Stakeholder Mapping & CATWOE Analysis - Cartographic Perspective (L0) – Empathy Map – Case Study: Understanding the Stakeholders.						
<b>UNIT - III</b>	<b>STEP 2: THE ‘DEFINE’ STAGE</b>					<b>(6)</b>
What is this stage about? – What role does a Design Thinker play in this stage? – What is the most important aspect of this stage? – Tools – What is the purpose in this stage? – Five-Whys – Anti-Pattern – Paraphrasing the Problem – Challenge Mapping – LORD: Definitive skill set for a Design Thinker – Case Study: Relooking at the Problem.						
<b>UNIT - IV</b>	<b>STEP 3: THE ‘DIVERGENCE’ &amp; ‘CONVERGENCE’ STAGE</b>					<b>(6)</b>
What is this stage about? – What role does a Design Thinker play in this stage? – What is the most important aspect of this stage? – Tools – What is the purpose in this stage? – Brainstorming – Metaphor – Random Association Technique – End-State Visualization - 10gm-100gm-1000gm – Prototyping – Wire framing for digital products – Case Study: Prototyping and Communicating for Effective Outcome.						
<b>UNIT - V</b>	<b>STEP 5: THE ‘COMMUNICATION’ STAGE</b>					<b>(6)</b>
What is this stage about? – What role does a Design Thinker play in this stage? – What is the most important aspect of this stage? – Tools – What is the purpose in this stage? – The 4Cs Framework – Naming – Packaging – Story boarding – Presentation – Distribution.						
<b>TOTAL: 45 PERIODS</b>						



<b>COURSE OUTCOMES:</b>													
<b>At the end of the course, the students will be able to:</b>													
<b>COs</b>	<b>Course Outcome</b>											<b>Cognitive Level</b>	
<b>CO1</b>	Demonstrate an understanding of Design Thinking concepts and principles by explaining their relevance in real-world contexts.											Understanding	
<b>CO2</b>	Articulate the significance of a Design Mind set and its impact on creative problem-solving.											Understanding	
<b>CO3</b>	Apply Design Thinking methods effectively at each stage of the problem-solving process.											Applying	
<b>CO4</b>	Identify and implement the phases of Design Thinking to address complex challenges systematically.											Applying	
<b>CO5</b>	Use a variety of Design Thinking tools to develop innovative solutions and refine ideas through iteration.											Applying	
<b>TEXT BOOKS:</b>													
<ol style="list-style-type: none"> <li>1. UnMukt – The Science &amp; Art of Design Thinking, Arun Jain</li> <li>2. Don Norman, The Design of Everyday Things, MIT Press, 2013</li> <li>3. Tim Brown, Change by Design: How Design Thinking Transforms Organizations and inspires innovation, Harper Collins Publishers Ltd, New York, First Edition, 2009.</li> </ol>													
<b>REFERENCES:</b>													
<ol style="list-style-type: none"> <li>1. Chrisitan Mueller-Roterberg, Handbook of Design Thinking – Tips &amp; Tools for how to design thinking, kindle Direct Publishing, First Edition, 2018.</li> <li>2. Johnny Schneider, Understanding Design Thinking, Lean and Agile, O’Reilly Media, California, First Edition, 2017</li> <li>3. Roger Martin, The Design of Business, Why Design Thinking is the next competitive advantage, Harvard Business Press, United States, First Edition, 2009.</li> <li>4. Idris Mootee, Design Thinking for Strategic Innovation, John Wiley &amp; Sons Inc, New Jersey, First Edition, 2013.</li> </ol>													
<b>Mapping of COs with POs and PSOs</b>													
<b>COs/ POs</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	<b>PO9</b>	<b>PO10</b>	<b>PO11</b>	<b>PSO1</b>	<b>PSO2</b>
<b>CO1</b>	3	3	2	2	2	2	2	3	2	3	3	2	-
<b>CO2</b>	3	3	2	2	2	2	2	3	2	3	3	2	-
<b>CO3</b>	3	3	3	3	3	2	2	3	2	3	3	2	-
<b>CO4</b>	3	3	3	3	3	2	2	3	2	3	3	2	-
<b>CO5</b>	3	3	3	3	3	2	2	3	2	3	3	2	-
<b>Avg.</b>	<b>3</b>	<b>3</b>	<b>2.6</b>	<b>2.6</b>	<b>2.6</b>	<b>2</b>	<b>2</b>	<b>3</b>	<b>2</b>	<b>3</b>	<b>3</b>	<b>2</b>	<b>-</b>
1-low, 2-medium, 3-high													

Chairman / BoS

24EET06	BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERING	Category	L	T	P	C
		ESC	3	0	0	3
(Common to BM, CB, CD, CE, CS, IO, IT, ME, SF)						
<b>PREREQUISITE:</b> Knowledge of mathematics, particularly differential equations, trigonometry, and basic calculus are required. A solid foundation in physics, especially in areas like electromagnetism and mechanics, is also important. Basic problem-solving skills are essential, as it helps to analyze circuits and understand electronic components.						
<b>OBJECTIVES:</b> <ul style="list-style-type: none"> <li>• To understand the basic definitions and principles governing DC and AC circuits.</li> <li>• To gain knowledge of the construction, working principles, and applications of DC machines, induction motors, and transformers.</li> <li>• To recognize the classification of wiring systems, earthing techniques, and the functioning of UPS systems.</li> <li>• To realize the operation and characteristics of semiconductor devices and their applications.</li> <li>• To impart the fundamentals of digital logic circuits and Arduino components.</li> </ul>						
<b>UNIT - I</b>	<b>DC AND AC CIRCUITS</b>	<b>(9)</b>				
<p><b>DC circuits:</b> Electrical quantities – Ohm's law – Kirchhoff's current and voltage laws – Series and parallel resistors – Simple problems.</p> <p><b>AC circuits:</b> Waveforms, average value, RMS value, form factor, peak factor, power and power factor – Pure R, L and C – Series RL and RC circuits.</p>						
<b>UNIT - II</b>	<b>ELECTRICAL MACHINES</b>	<b>(9)</b>				
DC machine: construction, working principle and applications – Single phase induction motor: Capacitor start capacitor run induction motor – Three phase induction motor: construction and working principle – Single phase transformer: construction and working principle.						
<b>UNIT - III</b>	<b>ELECTRICAL INSTALLATIONS</b>	<b>(9)</b>				
Classification of wiring system – Earthing – Types: pipe earthing, plate earthing, strip earthing – On-line and Off-line UPS – Lamps: Fluorescent tube, LED.						
<b>UNIT - IV</b>	<b>ANALOG ELECTRONICS</b>	<b>(9)</b>				
PN junction diode and Zener diode: Principle of operation and V-I characteristics – Half and full wave rectifier– Bipolar Junction Transistor: Construction and working.						
<b>UNIT - V</b>	<b>DIGITAL ELECTRONICS</b>	<b>(9)</b>				
Digital logic gates: NOT, AND, OR, NAND, NOR, EXOR – Digital circuits: half-adder, full-adder, JK and D flip flop – Introduction to Arduino components and IDE.						
<b>Total: 45 PERIODS</b>						

<b>COURSE OUTCOMES:</b>														
<b>At the end of the course, the students will be able to:</b>														
<b>COs</b>	<b>Course Outcome</b>												<b>Cognitive Level</b>	
CO1	Interpret the fundamental concepts of electrical circuits to solve the DC and AC circuit problems.												Understand	
CO2	Elaborate the construction and working principles of DC machines, induction motors and transformers.												Understand	
CO3	Describe the wiring systems, earthing techniques and the functionality of UPS and lighting systems.												Understand	
CO4	Identify the operation and characteristics of PN junction, Zener diode and BJT.												Understand	
CO5	Illustrate the functionality of digital logic gates, adders, flip-flops and Arduino components.												Understand	
<b>TEXT BOOKS:</b>														
<ol style="list-style-type: none"> <li>1. Kothari D.P and Nagrath I.J, “Basic Electrical and Electronics Engineering”, Second Edition, McGraw Hill, Uttar Pradesh, 2020.</li> <li>2. Bhattacharya S.K, “Basic Electrical and Electronics Engineering”, Pearson Education, Delhi, Second Edition, 2017.</li> </ol>														
<b>REFERENCES:</b>														
<ol style="list-style-type: none"> <li>1. Jain V.K, Amitabh Bajaj, “Design of Electrical installation”, University Science Press, New Delhi, 2016.</li> <li>2. Ramamoorthy M, Chandra Sekhar O, “Electrical Machines”, PHI Learning Pvt. Ltd, Delhi, 2018.</li> <li>3. Christopher Siu, “Electronic Devices, Circuits, and Applications”, Springer International Publishing, 2022.</li> <li>4. Kothari D.P, Dhillon J.S, “Digital Circuits &amp; Design”, First Edition, Pearson, Delhi, 2015.</li> </ol>														
<b>Mapping of COs with POs and PSOs</b>														
<b>COs/ POs</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	<b>PO9</b>	<b>PO10</b>	<b>PO11</b>	<b>PSO1</b>	<b>PSO2</b>
CO1	3	2	2	-	-	-	-	-	-	-	-	2	1	-
CO2	3	3	2	-	-	-	-	-	-	-	-	2	1	-
CO3	3	3	2	-	-	-	-	-	-	-	-	2	1	-
CO4	3	3	2	-	-	-	-	-	-	-	-	2	1	-
CO5	3	3	2	-	-	-	-	-	-	-	-	2	1	-
Avg.	<b>3</b>	<b>3</b>	<b>2</b>	-	-	-	-	-	-	-	-	<b>2</b>	<b>1</b>	-
1-low, 2-medium, 3-high														

Chairman / BoS

24GET29	தமிழரும் தொழில்நுட்பமும்	CATEGORY	L	T	P	C
		HSMC	1	0	0	1
<b>(அனைத்து துறைகளுக்கும் பொதுவானது)</b>						
<b>முன் கூட்டிய துறை சார்அறிவு :</b> தேவை இல்லை						
<b>அலகு - I</b>	<b>நெசவு மற்றும் பானைத் தொழில் நுட்பம்</b>	<b>(03)</b>				
சங்க காலத்தில் நெசவுத் தொழில் - பானைத் தொழில் நுட்பம் கருப்பு சிவப்பு பாண்டங்கள்- பாண்டகளில் கீறல் குறியீடுகள்						
<b>அலகு - II</b>	<b>வடிவமைப்பு மற்றும் கட்டிடத் தொழில் நுட்பம்</b>	<b>(03)</b>				
சங்ககாலத்தில் வடிவமைப்பு மற்றும் கட்டுமானங்கள் & சங்ககாலத்தில் வீட்டுப் பொருட்களில் வடிவமைப்பு-சங்ககாலத்தில் கட்டுமானப் பொருட்களும் நடு கல்லும் - சிலப்பதிகாரத்தில் மேடை அமைப்பு பற்றிய விவரங்கள்-மாமல்லபுரச் சிற்பங்களும், கோவில்களும் - சோழர் காலத்துப் பெருங்கோயில்கள் மற்றும் பிற வழிபாட்டுத் தலங்கள் - நாயக்கர் காலக் கோயில்கள் - மாதிரி கட்டமைப்புகள் பற்றி அறிதல், மதுரை மீனாட்சி அம்மன் ஆலயம் மற்றும் திருமலை நாயக்கர் மஹால் - செட்டி நாட்டு வீடுகள் - பிரிட்டிஷ் காலத்தில் சென்னை இந்தோ-சாரோசெனிக்கட்டிடக் கலை.						
<b>அலகு - III</b>	<b>உற்பத்தித் தொழில் நுட்பம்</b>	<b>(03)</b>				
கப்பல் கட்டும் கலை - உலோகவியல் - இரும்புத் தொழிற்சாலை - இரும்பை உருக்குதல், எஃகு - வரலாற்றுச் சான்றுகளாக செம்பு மற்றும் தங்க நாணயங்கள் - நாணயங்கள் அச்சடித்தல் - மணி உருவாக்கும் தொழிற்சாலைகள்-கல்மணிகள் - கண்ணாடி மணிகள் - சுடு மண்மணிகள் - சங்கு மணிகள்- எலும்புத் துண்டுகள் - தொல்லியல் சான்றுகள் - சிலப்பதிகாரத்தில் மணிகளின் வகைகள்.						
<b>அலகு - IV</b>	<b>வேளாண்மை மற்றும் நீர்ப்பாசனத் தொழில்நுட்பம்</b>	<b>(03)</b>				
அணை, ஏரி, குளங்கள், மதகு - சோழர் கால குமிழித்தூம் பின் முக்கியத்துவம் - கால்நடை பராமரிப்பு-கால்நடைகளுக்காக வடிவமைக்கப்பட்ட கிணறுகள் - வேளாண்மை மற்றும் வேளாண்மை சார்ந்த செயல்பாடுகள்-கடல்சார் அறிவு - மீன்வளம் - முத்து மற்றும் முத்துக் குளித்தல் - பெருங்கடல் குறித்த பண்டைய அறிவு-அறிவுசார் சமூகம்.						
<b>அலகு - V</b>	<b>அறிவியல் தமிழ் மற்றும் கணினித் தமிழ்</b>	<b>(03)</b>				
அறிவியல் தமிழின் வளர்ச்சி - கணினித் தமிழ் வளர்ச்சி - தமிழ் நூல்களை மின் பதிப்பு செய்தல் - தமிழ் மென் பொருட்கள் உருவாக்கம் - தமிழ் இணையக் கல்விக் கழகம் - தமிழ் மின் நூலகம்-இணையத்தில் தமிழ் அகராதிகள் சொற்குவைத் திட்டம்.						
<b>TOTAL: 15 PERIODS</b>						

<b>பாடம் கற்றத்தின் விளைவுகள்:</b> <b>பாடத்தை வெற்றிகரமாக கற்று முடித்த பின்பு,</b> <b>மாணவர்களால் முடியும் விளைவுகள்</b>		அறிவாற்றல் நிலை
CO1	சங்ககாலத் தமிழிர்களின் நெசவு மற்றும் பானைவனைதல் தொழில்நுட்பம் குறித்துகற்றுணர்தல்	புரிதல்
CO2	சங்ககாலத் தமிழிர்களின் கட்டிட தொழில் நுட்பம் கட்டுமான பொருட்கள் மற்றும் அவற்றை விளக்கும் தளங்கள் குறித்துஅறிவு	புரிதல்
CO3	சங்ககாலத் தமிழிர்களின் உலோகத்தொழில், நாணயங்கள் மற்றும் மணிகள் சார்ந்த தொல்லியல் சான்றுகள் பற்றிய அறிவு	புரிதல்
CO4	சங்ககாலத் தமிழிர்களின் வேளாண்மை, நீர்ப்பாசன முறைகள் மற்றும் முத்து குளித்தல் குறித்த தெளிவு	புரிதல்
CO5	நவீன அறிவியல் தமிழ் மற்றும் கன்னி தமிழ் குறித்த புரிந்து கொள்ளலும் மற்றும் பயன்படுத்தலும்	பகுப்பாய்வு

**Text Books:**

1	தமிழக வரலாறு – மக்களும் பண்பாடும்- கே கே பிள்ளை (வெளியீடு தமிழ்நாடு பாடநூல் மற்றும் கல்வியில் பணிகள் கழகம்)
2	கணினித் தமிழ் - முனைவர் இல. சுந்தரம் (விகடன் பிரசுரம்)

**Reference Books:**

1	சீழடி- வைகை நதிக்கரையில் சங்க கால நகர நாகரிகம்.( தொல்லியல் துறை வெளியீடு)
2	பொருநை-ஆற்றங்கரை நாகரிகம் ( தொல்லியல் துறை வெளியீடு)
3	Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Published by : The Author)
4	Porunai Civilization (Jointly Published by: Department of Archaeology &Tamil Nadu Textbook and Educational Services Corporation, Tamil Nadu)

**Mapping of COs with POs and PSOs**

COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	-	-	-	-	-	-	3	3	-	2	-	-	-
CO2	-	-	-	-	-	-	3	3	-	2	-	-	-
CO3	-	-	-	-	-	-	3	3	-	2	-	-	-
CO4	-	-	-	-	-	-	3	3	-	2	-	-	-
CO5	-	-	-	-	-	-	3	3	-	2	-	-	-
Avg.	-	-	-	-	-	-	3	3	-	2	-	-	-

1-low, 2-medium, 3-high

Chairman / BoS

24MAI29	PROBABILITY AND STATISTICS	Category	L	T	P	C
		BSC	2	1	2	4
<b>(Common to All Branches)</b>						
<b>PREREQUISITE:</b>						
The students should know the fundamental knowledge on probability, integration, measures of central tendency and dispersion, graphical representation of given data and basic computer knowledge.						
<b>OBJECTIVES:</b>						
<ul style="list-style-type: none"> <li>• To understand the basic concepts of probability and random variables.</li> <li>• To provide the skills on the two-dimensional random variables in solving engineering problems.</li> <li>• To develop the skills of testing of hypothesis for small and large samples.</li> <li>• To introduce the basic concepts of classifications of design of experiments.</li> <li>• To acquire the knowledge on statistical quality control.</li> </ul>						
<b>UNIT - I</b>	<b>ONE DIMENSIONAL RANDOM VARIABLES</b>					<b>(9)</b>
One dimensional Random Variable - Discrete and continuous random Variables -Expectations - Moment generating functions and their properties - Binomial, Poisson, Uniform and Normal distributions.						
<b>UNIT - II</b>	<b>TWO - DIMENSIONAL RANDOM VARIABLES</b>					<b>(9)</b>
Joint distributions – Marginal and conditional distributions – Covariance – Karl Pearson's Coefficient of Correlation - Spearman's Rank Correlation - Regression Analysis.						
<b>UNIT - III</b>	<b>TESTING OF HYPOTHESIS</b>					<b>(9)</b>
One sample and two sample test for means of large samples (Z- test), One sample and two sample tests for means of small samples (t-test), Chi-square - Independent of Attributes - F test for equality of variances.						
<b>UNIT - IV</b>	<b>DESIGN OF EXPERIMENTS</b>					<b>(9)</b>
Analysis of variance - One way and two-way classifications - Completely Randomized Design - Randomized Block Design - Latin Square Design.						
<b>UNIT - V</b>	<b>STATISTICAL QUALITY CONTROL</b>					<b>(9)</b>
Control charts for measurements ( $\bar{X}$ and R charts) – Control charts for C and P charts – Acceptance sampling for construction of an OC curve.						
<b>List of Exercise/Experiments (R Software):</b>						
<ol style="list-style-type: none"> <li>1. Determine the probability by using binomial distribution.</li> <li>2. Find the probability with the help of normal distribution.</li> <li>3. Determine the correlation co-efficient between X and Y.</li> <li>4. Calculate and plot the regression lines.</li> <li>5. Test the significance of difference between experimental and theoretical values of the data by using chi-square test.</li> <li>6. Examine the small samples using F distribution.</li> <li>7. Analyse the data using Randomized Block Design (RBD).</li> <li>8. Inspect the data using Latin Square Design (LSD).</li> <li>9. Find the <math>\bar{X}</math> and R charts.</li> <li>10. Compute c and p charts.</li> </ol>						
<b>Lecture:45 Laboratory:30 TOTAL: 75 PERIODS</b>						

<b>COURSE OUTCOMES:</b>													
<b>At the end of the course, the students will be able to:</b>													
<b>COs</b>	<b>Course Outcome</b>											<b>Cognitive Level</b>	
CO1	Illustrate the fundamental concepts of probability and standard distributions in real life phenomenon.											Understand	
CO2	Solve engineering problems by applying the concepts of two-dimensional random variables.											Understand	
CO3	Apply the concept of testing of hypothesis for small and large samples in mean and variance.											Apply	
CO4	Analyze the various statistical methods in Analysis of Variance.											Analyze	
CO5	Apply the quality control methods to design control charts.											Apply	
<b>TEXT BOOKS:</b>													
1. S.P. Gupta, “Statistical Methods”, Sulthan Chand & Sons, 46 <sup>th</sup> Edition, 2021.													
2. Milton. J. S. and Arnold. J.C., “Introduction to Probability and Statistics”, Tata McGraw Hill, 4 <sup>th</sup> edition, 2007.													
<b>REFERENCES:</b>													
1. Devore. J.L., “Probability and Statistics for Engineering and the Sciences”, Cengage Learning, New Delhi, 8 <sup>th</sup> Edition, 2014.													
2. Spiegel. M.R., Schiller. J. and Srinivasan, R.A., “Schaum’s Outline of Theory and Problems of Probability and Statistics”, Tata McGraw Hill Edition, 2004.													
3. Walpole. R.E., Myers. R.H., Myers. S.L. and Ye. K., “Probability and Statistics for Engineers and Scientists”, Pearson Education, Asia, 9 <sup>th</sup> Edition, 2010.													
4. R.C.Gupta, “Statistical Quality Controls”, Khanna Publishers, Delhi, 8 <sup>th</sup> Edition , 2008.													
<b>Mapping of COs with POs and PSOs</b>													
<b>COs/ POs</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	<b>PO9</b>	<b>PO10</b>	<b>PO11</b>	<b>PSO1</b>	<b>PSO2</b>
CO1	3	3	3	3	2	-	-	-	1	-	1	-	-
CO2	3	3	3	3	2	-	-	-	1	-	1	-	-
CO3	3	3	3	3	2	-	-	-	1	-	1	-	-
CO4	3	3	3	3	2	-	-	-	1	-	1	-	-
CO5	3	3	3	3	2	-	-	-	1	-	1	-	-
Avg.	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>2</b>	-	-	-	<b>1</b>	-	<b>1</b>	-	-
1-low, 2-medium, 3-high													

Chairman / BoS

24CHI07	APPLIED CHEMISTRY	Category	L	T	P	C
		BSC	3	0	2	4
<b>(Common to AE, CE, MECH and SFE)</b>						
<b>PREREQUISITE</b>						
The students must have knowledge about basic concepts of atoms, molecules, periodical properties, chemical bonding, molecular structure, shapes of the orbitals, electro chemistry, thermodynamics, chemical kinetics, organic reactions and their applications.						
<b>OBJECTIVES:</b>						
<ul style="list-style-type: none"> <li>• To gain in-depth knowledge on the water treatment methods and its industrial applications.</li> <li>• To acquaint the basic concepts of corrosion mechanism and its control.</li> <li>• To assimilate the principles and functioning of batteries, fuel cell and solar cell.</li> <li>• To imbibe basic concepts and applications of phase rule and lubricants.</li> <li>• To impart knowledge on manufacturing advanced engineering materials and its uses.</li> </ul>						
<b>UNIT - I</b>	<b>WATER TREATMENT</b>					<b>(9)</b>
Hardness – types, units – estimation of hardness by EDTA method; Boiler feed water – requirements, disadvantages of using hard water in boilers – scale and sludge – priming and foaming – caustic embrittlement – boiler corrosion. Softening methods – internal conditioning – calgon, phosphate – external conditioning – zeolite process and ion exchange process; Desalination – reverse osmosis. Domestic water treatment (Sterilisation process Only).						
<b>UNIT - II</b>	<b>ELECTROCHEMISTRY AND CORROSION</b>					<b>(9)</b>
Introduction – electrode potential – Nernst equation – EMF series and its significance; E – Vehicles - Need - Types – Advantages and Disadvantages; Corrosion – causes, consequences – classification – chemical corrosion – electro chemical corrosion – mechanism; Galvanic & differential aeration corrosion – factors influencing corrosion – corrosion control (Sacrificial anode and Impressed Current Cathodic protection method).						
<b>UNIT - III</b>	<b>ENERGY STORAGE DEVICES</b>					<b>(9)</b>
Batteries – primary battery – Dry cell, secondary batteries – lead-acid and lithium-ion batteries. Fuel cells – H <sub>2</sub> -O <sub>2</sub> fuel cell, solar cells – principle, applications and advantages; Nuclear energy: Light water nuclear power plant - breeder reactor.						
<b>UNIT - IV</b>	<b>PHASE RULE &amp; LUBRICANTS</b>					<b>(9)</b>
Phase rule: Introduction, definition of terms with examples. One component system – water system; Reduced phase rule; Two component system: lead-silver system. Lubricants – definition – function – characteristics – properties – viscosity index, flash and fire points, cloud and pour points, oiliness; Solid lubricants – graphite and MoS <sub>2</sub> .						
<b>UNIT - V</b>	<b>ADVANCED ENGINEERING MATERIALS</b>					<b>(9)</b>
Abrasives – Moh's scale of hardness – types – natural [Diamond] – synthetic [SiC]; Refractories – characteristics – classifications [Acidic, basic and neutral refractories] – properties – refractoriness – RUL – porosity – thermal spalling; Nano materials – CNT– synthesis [CVD, laser evaporation, pyrolysis] – applications of nano materials.						
<b>List of Exercise/Experiments:</b>						
<ol style="list-style-type: none"> <li>1. Estimation of total, permanent and temporary hardness of water sample by EDTA method.</li> <li>2. Estimation of chloride content in water by Argentometric method [Mohr's Method].</li> <li>3. Conductometric titration of strong acid with strong base (HCl Vs NaOH).</li> <li>4. Determination of rate of corrosion of mild steel by weight loss method.</li> <li>5. Estimation of dissolved oxygen in water (Winkler's Method).</li> <li>6. Conductometric titration of mixture of acids (HCl &amp; CH<sub>3</sub>COOH) with strong base.</li> <li>7. Estimation of Fe<sup>2+</sup> ion by potentiometric titration.</li> <li>8. Estimation of HCl by p<sup>H</sup>- Metry.</li> <li>9. Conductometric precipitation titration using BaCl<sub>2</sub>-Na<sub>2</sub>SO<sub>4</sub>.</li> </ol>						



10. Preparation of ZnO nanocrystal by precipitation method.													
<b>Lecture:45 Laboratory:30 TOTAL: 75 PERIODS</b>													
<b>COURSE OUTCOMES:</b>													
<b>At the end of the course, the students will be able to:</b>													
COs	Course Outcome											Cognitive Level	
CO1	Assess the quality of water from quality water parameters											Understand	
CO2	Recognize the concept of corrosion and its control.											Understand	
CO3	Make use of batteries, fuel cell and solar cell for the production of electricity.											Apply	
CO4	Apply Knowledge of phase rule and lubricants for materials choosing.											Apply	
CO5	Identify the manufacturing processes of advanced engineering materials and its uses.											Apply	
<b>TEXT BOOKS:</b>													
1. S S. Dara and S. S. Umare, “A Text book of Engineering Chemistry”, S.Chand & Co.Ltd., 12 <sup>th</sup> Edition, 2015.													
2. P.C. Jain and Monica Jain, “Engineering Chemistry”, Dhanpat Rai Pub. Co., 16 <sup>th</sup> Edition, 2013.													
3. Wiley, “Engineering Chemistry”, Wiley India Pvt. Ltd., 2 <sup>nd</sup> Edition, 2013.													
<b>REFERENCES:</b>													
1. Dr. A. Ravikrishnan, “Engineering Chemistry”, Srikrishna Hi-tech Publishing Company Pvt. Ltd., 21 <sup>st</sup> Edition, 2022.													
2. J. Mendham, R. C. Denney, J. D. Barnes, M. J. K. Thomas and B. Sivasankar, “Vogel’s Text book of Quantitative Chemical Analysis”, Pearson Education Pvt., Ltd., 6 <sup>th</sup> Edition, 2019.													
3. Shashi Chala, “A Text book of Engineering Chemistry”, Dhanpat Rai Pub. Co., 2015.													
4. S. K. Bhasin and Sudha Rani, “Laboratory Manual of Engineering Chemistry”, Dhanpat Rai Publishing Company Private Limited, 3 <sup>rd</sup> Edition, 2012.													
<b>NPTEL LINKS:</b>													
1. <a href="https://nptel.ac.in/courses/113101098">https://nptel.ac.in/courses/113101098</a>													
2. <a href="https://nptel.ac.in/courses/113105102">https://nptel.ac.in/courses/113105102</a>													
<b>Mapping of COs with POs and PSOs</b>													
COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	2	2	-	1	-	3	1	-	-	2	-	-
CO2	3	2	2	-	1	-	3	1	-	-	2	-	-
CO3	3	2	2	-	1	-	2	1	-	-	2	-	-
CO4	3	2	2	-	1	-	2	1	-	-	2	-	-
CO5	3	2	2	-	1	-	2	1	-	-	2	-	-
Avg.	<b>3</b>	<b>2</b>	<b>2</b>	<b>-</b>	<b>1</b>	<b>-</b>	<b>2.6</b>	<b>1</b>	<b>-</b>	<b>-</b>	<b>2</b>	<b>-</b>	<b>-</b>
1-low, 2-medium, 3-high													

Chairman / BoS

24ENP29	PROFESSIONAL COMMUNICATION LABORATORY	Category	L	T	P	C
		HSMC	0	0	2	1
<b>(Common to All Branches)</b>						
<b>PREREQUISITE:</b> Students having prior knowledge from the Professional Communication course with a solid base of LSRW skills are the prerequisites for the course.						
<b>OBJECTIVES:</b> <ul style="list-style-type: none"> <li>• To provide self-paced learning to consolidate their understanding of advanced grammar and vocabulary Methods.</li> <li>• To equip the students with the required LSRW skills to handle advanced communication situations in English.</li> <li>• To make learners to speak in simple sentences without any hesitation.</li> <li>• To facilitate learners to draft basic formal written communication.</li> <li>• To provide audio and video support to ensure meaningful skill acquisition.</li> </ul>						
<b>UNIT - I</b>	<b>GRAMMAR</b>	<b>(6)</b>				
Types of Sentences – Tenses & Voice- Concord – Auxiliary-Infinitive – Article-preposition – Comparative and Superlative adjective. Discourse Markers –Linkers: sequential – past time (later) Connecting words expressing cause and effect, contrast. Markers to structure informal spoken discourse Verb forms WH- and Yes/No Questions in present / past Complex question tags Broader range of intensifiers; So, such, too, enough, connecting words expressing cause and effect, contrast.						
<b>UNIT – II</b>	<b>LISTENING</b>	<b>(6)</b>				
Short conversations / monologues: numbers and spelling (dates, prices, percentages, figures, etc.) and locate specific information, longer monologue and note taking – gap filling, Understanding the gist and extracting main idea. Conversation between two employees – Description of gadgets – Enquiring about orders and deliveries – Chasing an order: Telephone Conversations – Radio Interview – Voicemail messages and phone conversations – Welcome speech at a conference – Statistical information.						
<b>UNIT – III</b>	<b>SPEAKING</b>	<b>(6)</b>				
Talking about oneself, agreeing and disagreeing, expressing preferences-mini-presentation on a business theme (Oral) - Giving information and expressing opinions- discussion on business-related topics - Helping students in achieving clarity and fluency; manipulating paralinguistic features of speaking (voice modulation, pitch, tone stress, effective pauses) Conducting Task oriented interpersonal, informal and semiformal Speaking / Classroom Presentation - Teaching strategies for Group Discussion - Teaching Cohesion and Coherence - Teaching effective communication & strategies for handling criticism and adverse remarks - Teaching strategies of Turn- taking, effective intervention, and courtesies, Role Play, Mock & HR Interview.						
<b>UNIT - IV</b>	<b>READING</b>	<b>(6)</b>				
Short texts and understand the main message (signs, messages, postcards, notes, emails, labels) – Read and find specific information- Interpreting visual information-Comprehend detailed factual information—gather the gist- understand grammar and structure of the given passage- transferring information – Radio Commentary, Technical Texts and Case Studies – Guiding students for Intensive & Extensive Reading – Reading notices, messages, adverts, leaflets, contents pages, graphs, charts, tables, business letters, product descriptions, reports, minutes, newspaper or magazine articles, memos.						

UNIT – V	WRITING											(6)	
Internal written communication - short messages to colleagues - note, message, memo, email- External communication - letter, email, notice-set phrases for letters and e-mails-Cohesive devices - All varieties of Technical Report, Business Letters and Job Application - Punctuation & Spelling, Semantics of Connectives, Modifiers and Modals, variety of sentences and paragraphs - Organizational Communication: Memo, Notice, Circular, Agenda / Minutes													
<b>TOTAL = 30 PERIODS</b>													
<b>COURSE OUTCOMES:</b>													
<b>At the end of the course, the learners will be able to:</b>													
COs	Course Outcome											Cognitive Level	
CO1	Understand and apply the basic grammar and learn the range of vocabulary.											Understand	
CO2	Listen enthusiastically and consolidate the messages and information of monologues and dialogues.											Remember	
CO3	Convey the views and opinions clearly in simple sentences.											Apply	
CO4	Read and comprehend the statistics and texts with clear understanding.											Analyse	
CO5	Write the contexts relevant to the topics efficiently.											Understand	
<b>TEXT BOOKS:</b>													
1. Whitby Norman, Business Benchmark Pre-Intermediate to Intermediate Student's Book CUP Publications, 3 <sup>rd</sup> Edition, 2018													
2. Wood Ian, Williams Anne, Cowper Anna, Pass BEC Preliminary, Cengage Learning, 2 <sup>n</sup> Edition, 2015.													
<b>REFERENCES:</b>													
1. BEC Preliminary – Cambridge Handbook for Language Teachers, 2 <sup>nd</sup> Edition, CUP 2000.													
2. Hewings Martin – Advanced grammar in use- Upper-Intermediate Proficiency, CUP, 3 <sup>rd</sup> Edition, 2013.													
Mapping of COs with POs and PSOs													
COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	2	-	-	-	-	-	-	2	3	-	-	-	-
CO2	2	-	-	-	-	-	-	2	3	-	-	-	-
CO3	2	-	-	-	-	-	1	2	3	-	-	-	-
CO4	2	-	-	-	-	-	1	-	3	-	-	-	-
CO5	2	-	-	-	-	-	1	-	3	-	-	-	-
Avg.	2	-	-	-	-	-	0.6	1.2	3	-	-	-	-

Chairman / BoS

24CSP26	PYTHON PROGRAMMING LABORATORY	Category	L	T	P	C
		ESC	0	0	2	1
<b>(Common to All Branches)</b>						
<b>PREREQUISITE:</b> Students must have basic knowledge on programming principles, such as variables, simple data types, control structures, problem solving and logical thinking skills.						
<b>OBJECTIVES:</b> <ul style="list-style-type: none"> <li>• To perform operations like reversing, palindrome checking, and character replacement.</li> <li>• To utilize functions for computing mathematical calculations and solve specific problems.</li> <li>• To impart knowledge on conditionals and loops to address various problem-solving scenarios.</li> <li>• To explore sets and dictionaries for sorting, searching, and removing duplicates in data.</li> <li>• To acquire knowledge in polymorphism, exception handling, GUI design, and web development.</li> </ul>						
<b>List of Exercise/Experiments:</b> <ol style="list-style-type: none"> <li>1. Implementing programs using Strings. (reverse, palindrome, character count, replacing characters)</li> <li>2. Implementing programs using Functions (GCD of two numbers, Factorial)</li> <li>3. Scientific problems using conditional statements and loops. (Largest among three numbers, Number series, Number Patterns)</li> <li>4. Implementing real-time applications using Sets, Dictionaries (Sorting, Searching, Remove Duplicates)</li> <li>5. Implementing real-time/technical applications using Lists, Tuples. (Swapping two elements, Reversing a List / Sorting Tuples)</li> <li>6. Create a Python program to demonstrate polymorphism with inheritance. (Single, Multilevel Inheritance, Hierarchical)</li> <li>7. Implement a simple calendar in python program without using the calendar module using string array or list.</li> <li>8. Write a program to demonstrate the user-defined exception handling mechanism in Python.</li> <li>9. Design and implement a graphical user interface to perform any arithmetic operation.</li> <li>10. Implementing a web application with MySQL database integration for CRUD operations (Flask / Django Framework)</li> </ol>						
<b>TOTAL: 30 PERIODS</b>						
<b>COURSE OUTCOMES:</b> <b>At the end of the course, the students will be able to:</b>						
<b>COs</b>	<b>Course Outcome</b>					<b>Cognitive Level</b>
CO1	Design simple programs using conditional statements and loops.					Apply
CO2	Demonstrate the functions to perform mathematical calculations and solve specific problems.					Apply
CO3	Apply conditional and looping statements to solve problems.					Apply
CO4	Apply sets and dictionaries for sorting, searching, and removing duplicates.					Apply
CO5	Implement polymorphism, manage exceptions, develop GUIs, and build web applications with MySQL.					Apply

**REFERENCES:**

1. Yashwant Kanetkar, Aditya Kanetkar, “Let Us Python”, BPB Publications, 5th Edition, 2023.
2. Wesley J.Chun, “Core Python Programming”, Pearson Education, 2nd Edition, 2017.

**Mapping of COs with POs and PSOs**

COs/ POs	PO1	PO2	PO3	PO4	PO5	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
<b>CO1</b>	2	3	3	2	2	2	-	-	1	-	-	1	-	-
<b>CO2</b>	3	3	3	2	2	3	-	-	1	-	-	1	-	-
<b>CO3</b>	3	3	3	2	2	3	-	-	1	-	-	1	-	-
<b>CO4</b>	3	3	3	1	3	3	-	-	1	-	-	1	-	-
<b>CO5</b>	3	3	3	1	3	3	-	-	1	-	-	1	-	-
<b>Avg.</b>	<b>2.8</b>	<b>3</b>	<b>3</b>	<b>1.6</b>	<b>2.6</b>	<b>2.8</b>	-	-	<b>1</b>	-	-	<b>1</b>	-	-

1-low, 2-medium, 3-high

Chairman / BoS

24AUP21	COMPUTER AIDED DRAWING LABORATORY	Category	L	T	P	C
		PCC	0	0	2	1
<b>PREREQUISITE</b>						
<p>Computer Aided Drawing requires a good grasp of basic geometry and algebra in understanding and applying dimensions and measurements in AutoCAD software. Knowing to work with 2D shapes and structures will be crucial as AutoCAD is heavily used for creating and manipulating 2D designs. Depending on the type of CAD software, understanding both 2D and 3D design principles might be necessary. For specific types of CAD applications (like mechanical engineering or architectural design), a foundational knowledge in these areas can be useful.</p>						
<b>OBJECTIVES:</b>						
<ol style="list-style-type: none"> <li>To study the drawing tools, commands and draw the two-dimensional drawings in the CAD software.</li> <li>To perceive the creation of simple figures and title block.</li> <li>To acquire the knowledge of orthographic projection and creation of plan of simple civil structures.</li> <li>To sketch the intricate drawings with multiple commands and sectional views.</li> <li>To develop isometric projection and avail the drafts of the 3D models using drafting tools.</li> </ol>						
<b>List of Exercise/Experiments:</b>						
<ol style="list-style-type: none"> <li>Study of drawing tools, commands and coordinate systems in 2D software.</li> <li>Creation of simple figures.</li> <li>Creation of Title Block.</li> <li>Orthographic projections of pictorial views.</li> <li>Plan of a simple residential building.</li> <li>Construction of simple truss.</li> <li>Creation of drawings with multiple commands.</li> <li>Sectional drawings.</li> <li>Isometric projection of simple solids.</li> <li>Drafting the 2D multi-view drawings from 3D model.</li> </ol>						
<b>TOTAL: 30 PERIODS</b>						
<b>COURSE OUTCOMES:</b>						
<b>At the end of the course, the students will be able to:</b>						
COs	Course Outcome		Cognitive Level			
CO1	Recall the drawing tools and commands and produce two dimensional objects in CAD software.		Remember			
CO2	Perceive the creation of simple figures and title block.		Understand			
CO3	Acquire the knowledge of orthographic projection and creation of plan of simple civil structures.		Understand			
CO4	Portray the intricate drawings with multiple commands and sectional views.		Understand			
CO5	Develop isometric projection and acquire drafts of 3D model.		Apply			

**REFERENCES:**

1. Bhatt. N. D., Engineering Drawing, Charotar Publishing House, Fifty Third Edition, 2014.
2. <https://bietsikar.ac.in/documents/9877270014CAD%20LAB%20MANUAL.pdf>

**Mapping of COs with POs and PSOs**

COs/ POs	PO1	PO2	PO3	PO4	PO5	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
<b>CO1</b>	3	-	-	-	3	-	-	-	-	2	-	1	2	-
<b>CO2</b>	3	-	-	-	3	-	-	-	-	2	-	1	2	-
<b>CO3</b>	3	-	-	-	3	-	-	-	-	2	-	1	2	-
<b>CO4</b>	3	-	-	-	3	-	-	-	-	2	-	1	2	-
<b>CO5</b>	3	-	-	-	3	-	-	-	-	2	-	1	2	-
<b>Avg.</b>	<b>3</b>	-	-	-	<b>3</b>	-	-	-	-	<b>2</b>	-	<b>1</b>	<b>2</b>	-

1-low, 2-medium, 3-high

**Chairman / BoS**

24SSP29	APTITUDE AND CODING SKILLS – II	Category	L	T	P	C
		EEC	0	0	2	1
<b>(Common to All Branches)</b>						
<b>OBJECTIVES:</b>						
<b>The Course will enable the learners:</b>						
<ul style="list-style-type: none"> <li>• To expose to various concept of Aptitude problem solving</li> <li>• To solve the problem and to improve analytical skill based on company specific skill</li> <li>• To develop proficiency in verbal reasoning for improved critical thinking.</li> <li>• To build and enrich the communication skills</li> <li>• To Apply fundamental Python programming concepts, including variables, data types, control structures, and functions, to solve basic computational problems effectively</li> </ul>						
<b>UNIT - I</b>	<b>NUMBERS AND SHARE BASED CONCEPTS</b>					(6)
Problems on Numbers – Unit Digits – Squares and Cubes – Remainder Theorem – Averages - Ratio Proportions and Partnership – Percentage – Profit and Loss.						
<b>UNIT - II</b>	<b>BASICS OF WORK BASED CONCEPTS</b>					(6)
Introduction to time and work –Introduction to Time, Speed and Distance, Problems on Trains.						
<b>UNIT - III</b>	<b>LOGICAL REASONING</b>					(4)
Blood Relations – Ranking and Ordering – Inequalities – Cause and Effect.						
<b>UNIT - IV</b>	<b>VERBAL ABILITY</b>					(7)
Yes or No and “WH” Questions – Conjunctions – Count / Uncounted Nouns – Direct and Indirect Speech - Active and Passive Voice.						
<b>UNIT - V</b>	<b>PYTHON PROGRAMMING FUNDAMENTALS</b>					(7)
Introduction-Features-Environment setup; Basic syntax: variable-data types-operators-control statements-if-if-else- loop-break-continue, etc. List- operations on list; String operations- access; Tuple: operations on tuple; Dictionaries: Accessing dictionaries, working with dictionaries; Functions-Exception Handling-Input & Output-Modules-OOPs concepts - Numerical Programming.						
<b>TOTAL: 30 PERIODS</b>						
<b>COURSE OUTCOMES:</b>						
<b>At the end of the course, the students will be able to:</b>						
COs	Course Outcome					Cognitive Level
CO1	Develop problem-solving skills and identify optimal solutions efficiently.					Understanding
CO2	Solve problems on quantitative aptitude					Applying
CO3	Resolve problems with logical reasoning					Applying
CO4	Develop proficiency in verbal and communication for improved and effective articulation of ideas.					Applying
CO5	Implement Python coding by utilizing appropriate data structures.					Applying
<b>TEXT BOOKS:</b>						
<ol style="list-style-type: none"> <li>1. R S Aggarwal, Quantitative Aptitude for Competitive Examinations.</li> <li>2. R.S. Aggarwal, A Modern Approach to Verbal &amp; Non-Verbal Reasoning.</li> <li>3. Wren &amp; Martin, High School English Grammar &amp; Composition</li> <li>4. Allen B. Downey, Think Python: How to Think like a Computer Scientist, 2<sup>nd</sup> Edition, O’Reilly Publishers, 2016</li> <li>5. Karl Beecher, Computational Thinking: A Beginner's Guide to Problem Solving and Programming, 1<sup>st</sup> Edition, BCS Learning &amp; Development Limited, 2017.</li> </ol>						



**REFERENCES:**

1. Paul Deitel and Harvey Deitel, Python for Programmers, Pearson Education, 1<sup>st</sup> Edition, 2021.
2. Martin C. Brown, Python: The Complete Reference, 4<sup>th</sup> Edition, Mc-Graw Hill, 2018.
3. <https://www.python.org/>

**Mapping of COs with POs and PSOs**

COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	3	3	-	3	3	-	3	1	-	3	-	-
CO2	3	3	3	-	3	3	-	3	1	-	3	-	-
CO3	3	3	3	-	3	3	-	3	3	-	3	-	-
CO4	-	-	-	-	3	3	-	3	3	-	3	-	-
CO5	3	3	3	-	3	3	-	3	2	-	3	-	-
Avg.	<b>2.4</b>	<b>2.4</b>	<b>2.4</b>	-	<b>3</b>	<b>3</b>	-	<b>3</b>	<b>2</b>	-	<b>3</b>	-	-

**Chairman / BoS**